The PHOTOFACT Servicer

SET 409 ★ *Published for all users of Howard W. Sams' Photofact Folders* ★ JULY 1, 1958

CONTENTS PHOTOFACT SET 409

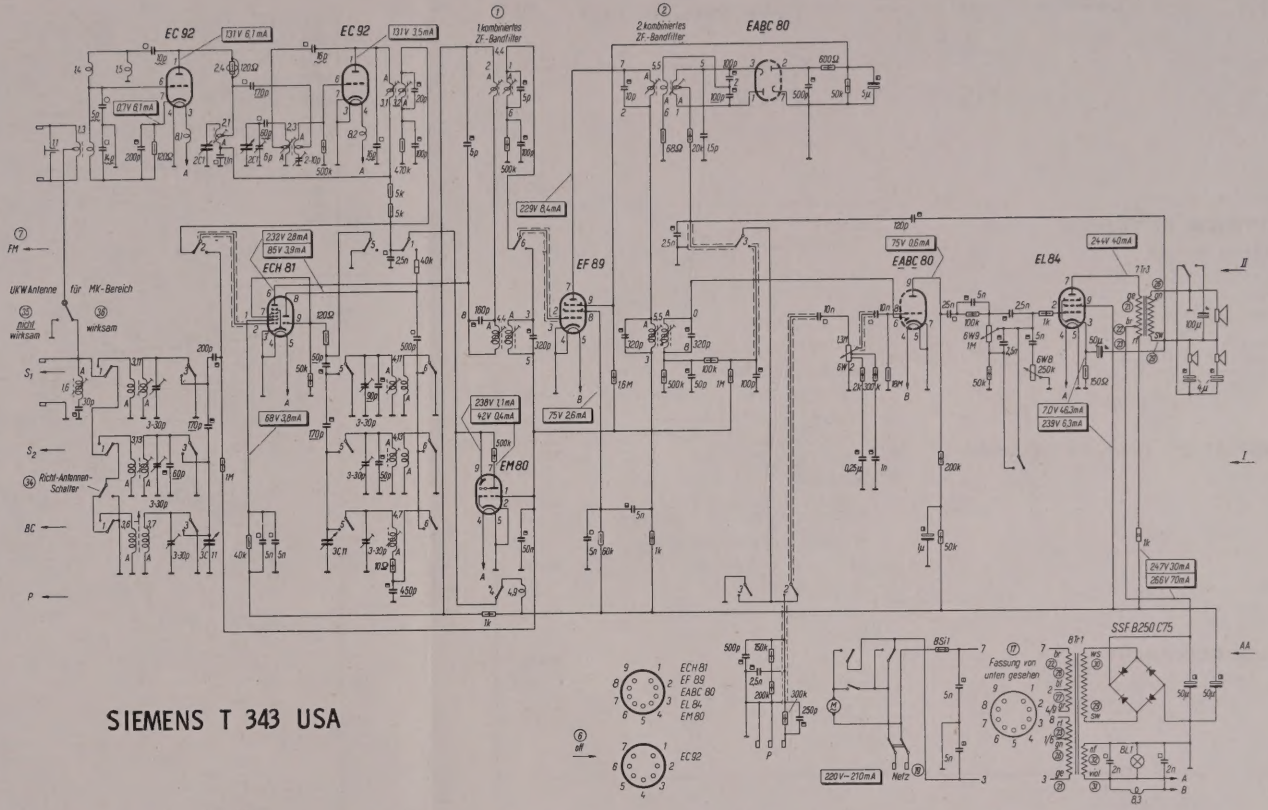
TRADE NAME AND MODEL	SET AND FOLDER NO.
TELEVISION RECEIVERS	
GENERAL ELECTRIC	
14P1208, 14P1215, 14P1216 & UHF (Q3 Line)	409-1
MUNTZ	
821 Series, 824 Series, 827 Series	409-2
PHILCO	
F3042F, G, F3044A, S, WA, F3202C, F3204B, L, M, F4221, L, F4222, L, F4629, L, W, UF3042F, G, UF3044A, S, WA, UF3202C, UF3204B, L, M, UF4221, L, UF4222, L, UF4629, L, W (Ch. 8H25, U, 8L35, U)	409-3
PRODUCTION CHANGE BULLETIN	
GROMMES	
LJ-6	409-4
221A	409-4
SYLVANIA Television Rec.	
17P101, J, 17P102, 17P103, 17P104, 17P105, 17P201, 17P202 (Ch. 1-537-1, -3, -4)	409-4
WESTINGHOUSE Television Rec.	
Chassis V-2372-23, -27, -67, V-2382-202, -204, -602, -604	409-4
OTHER EQUIPMENT	
ADMIRAL	
341, 347, 362, 363, 364, 372, 373 (Ch. 4T2)	409-5
BRAUN	
MM4D, LO, W (Ch. RC-62)	409-6
CHEVROLET	
987724	409-7
GENERAL ELECTRIC	
T-115A, T-116	409-8
GRUNDIG MAJESTIC	
7000, 7005, 7015	409-9
KNIGHT	
KN-100 (92SX401)	409-10
KN-110 (92SX403)	409-11
MOTOROLA	
2F21B, R (Ch. HS-598)	409-12
5R23G, -1, 5R23N, -1 (Ch. HS-600, HS-643)	409-13
PERPETUUM-EBNER Record Changer	
Rex Deluxe	409-14
SILVERTONE	
8228, 8229 (Ch. 132.43100)	409-15
SONY	
TR-63	409-16
STEELMAN	
4A20	409-17

The service information in this Servicer provides data on models which we have been unable to present in PHOTOFACT Folders. The receivers are not in current production; a requirement for PHOTOFACT coverage, and we are therefore presenting schematics and supplementary data that will be of assistance when servicing these models.

1 Combination I-f transformer I
2 Combination I-f transformer II
3 —
4 Loading capacity of resistors
- 0.25 W
- 0.5 W
- 1 W
- 2 W

5 Operating voltages of capacitors
- 12/15 V ~
- 70/80 V
- 100/110 V ~
- 125 V
- 250 V ~
- 250 V ~ (b)
- 350/380 V ~
- 500 V ~
- 700 V ~

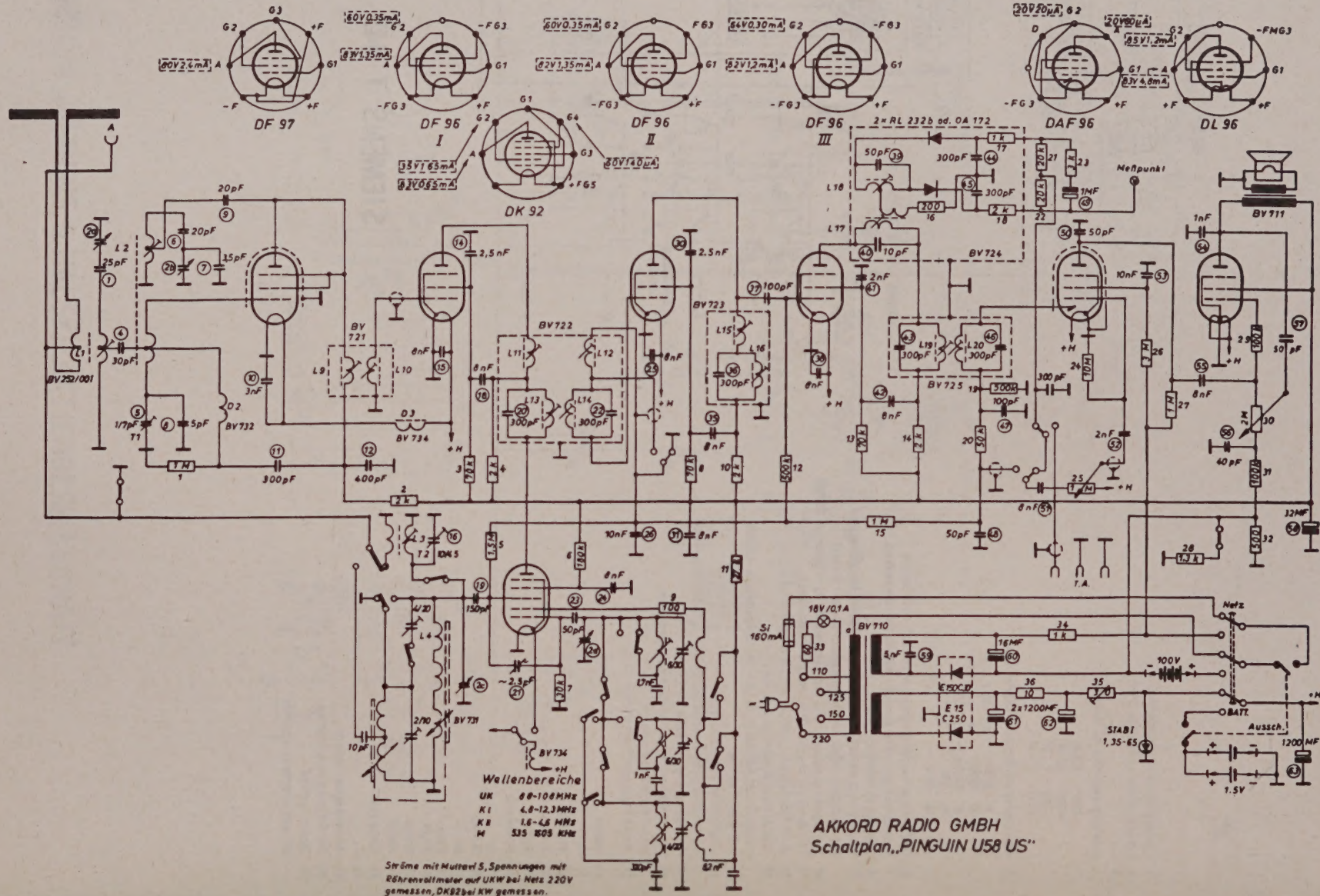
6 OFF: Powerswitch coupled with each pushbutton
7 Pushbutton position shown: Button FM depressed
8 Subject to changes
9 Current and voltage readings with button M depressed; FM voltages extra; variable capacitor half turned
10 Voltages measured with tube voltmeter R_i = approx. 20 MΩ
11 Currents measured with Multizet instrument
12 A = front (lower end of single-layer coils)
13 Capacitors underscored: ~~
ceramic capacitors with special temperature values for stabilization
14 Capacitors underscored —:
ceramic or similar capacitors with ≤ 2.5% tolerance
15 Soldering side of tube sockets
16 Mains power consumption measured with moving-iron instrument
17 Socket as seen from below
18 —
19 Mains
20 —
21 Yellow
22 Brown
23 Red
24 Red-Black
25 —
26 Green
27 Gray
28 Blue
29 Black
30 White
31 Violet
32 Colorless
33 —
34 Wavemagnet switch
35 FM antenna inoperative
36 Operative for BC and shortwave bands



SIEMENS T 343 USA

SCHEMATIC DIAGRAM COURTESY SIEMENS & HALSKE AKTIENGESELLSCHAFT

PINGUIN U 58 US



SCHEMATIC DIAGRAM COURTESY AKKORD RADIO GMBH

SET 409 FOLDER 1

GENERAL ELECTRIC MODELS
14P1208, 14P1215, 14P1216 & UHF (Q3 Line)

DISASSEMBLY INSTRUCTIONS

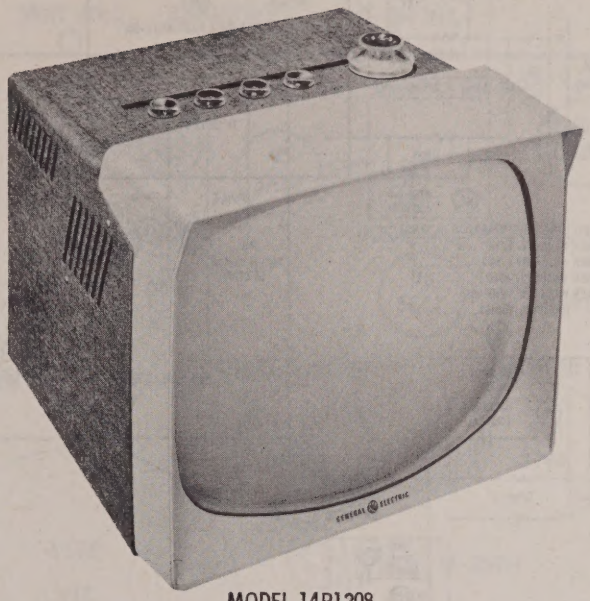
CHASSIS REMOVAL

1. Remove 6 push-on type knobs from the top.

2. Remove 2 metal screws holding the rear cover. Remove the rear cover.

3. Remove 2 screws holding the top of the chassis, 3 from the bottom.

4. Remove the Picture Tube socket, Ion Trap, Yoke Clamp. Partially remove the chassis and remove the HV lead and speaker leads. Remove the chassis.



MODEL 14P1208

CAUTION NOTE

ONE SIDE OF AC LINE CONNECTED TO CHASSIS
Care should be exercised when connecting test equipment or physically contacting the chassis.

TRADE NAME	General Electric	MODELS 14P1208, 14P1215, 14P1216 & UHF (Q3 Line)
MANUFACTURER	General Electric Co., Appliance and Television Receiver Div., Louisville, Ky.	
TYPE SET	Television Receiver	
TUBES	Fourteen	
POWER SUPPLY	110-125 Volts AC, 60 Cycle	RATING 110 Watts, 1.15 Amp. @ 117 Volts AC
TUNING RANGE	Channels 2 thru 13 VHF, 14 thru 83 UHF, Video IF 45.75MC, Sound IF 41.25MC (Intercarrier)	

SERVICING IN THE FIELD

TUNER OSCILLATOR ADJUSTMENTS

Touch-up adjustment of the VHF Oscillator is possible by removing the Channel Selector and Fine Tuning knobs. Set the Fine Tuning at the center of its range. One slug for HIGH band adjustment is located at 1 o'clock, and should be adjusted first. The LOW band adjustment is located at 7 o'clock. Adjust for best picture and sound. NOTE: Chassis may have to be removed for high band adjustment.

PICTURE TUBE SAFETY GLASS CLEANING

Remove 4 metal screws holding the front. Pull front out at the bottom to remove.

FOCUS

Focus may be varied by moving the lead of pin 4 of the picture tube to either side of the Horizontal Hold Control or to a Boost B terminal to the right of the control. Adjust the Ion Trap for maximum brightness consistent with good focus.

HORIZONTAL OSCILLATOR FIELD ADJUSTMENTS

For adjustment of the Horizontal Oscillator, it is necessary to remove the rear cover and supply power to set. Set the Horizontal Hold at the center of its range and adjust the Horizontal Frequency slug (B1) until the picture synchronizes horizontally. (For location, see tube placement chart.)

SOUND IF DETECTOR BUZZ ADJUSTMENT

To eliminate intercarrier buzz, adjust the AM Reject Control for MINIMUM buzz and maximum sound. (For location, see tube placement chart.)

FUSES

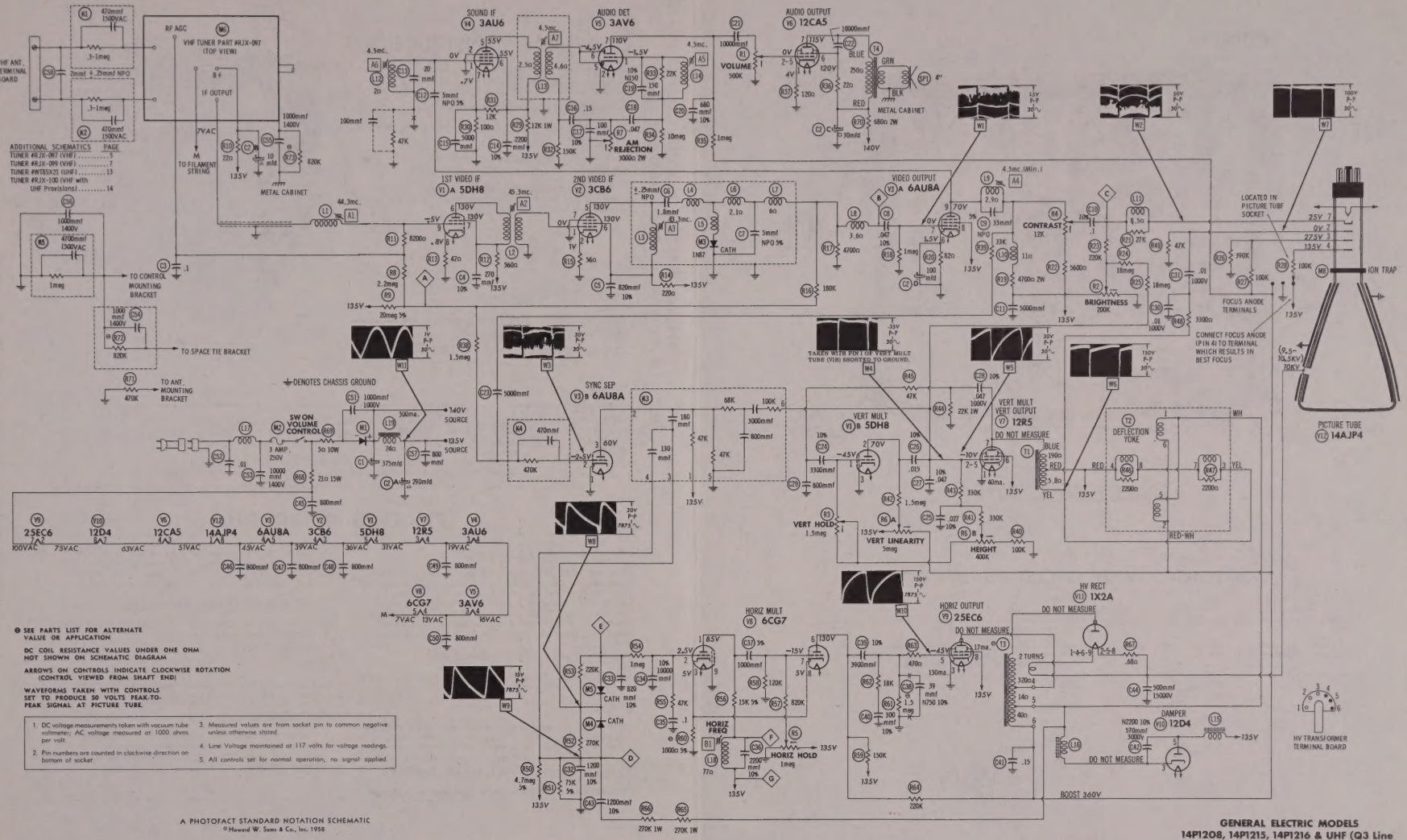
One fuse is used for low voltage supply protection. (For location, see tube placement chart.)

CENTERING

Centering is accomplished mechanically by adjusting two magnetic rings around the neck of the picture tube. Rotate the two rings around the neck of the tube until the picture is properly centered.

HOWARD W. SAMS & CO., INC. • Indianapolis 5, Indiana

The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed. Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. © 1958 Howard W. Sams & Co., Inc., Indianapolis 5, Indiana. Printed in U.S. of America



⊖ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM

ARROWS ON CONTROLS INDICATE CLOCKWISE ROTATION (CONTROL VIEWED FROM SHAFT END)

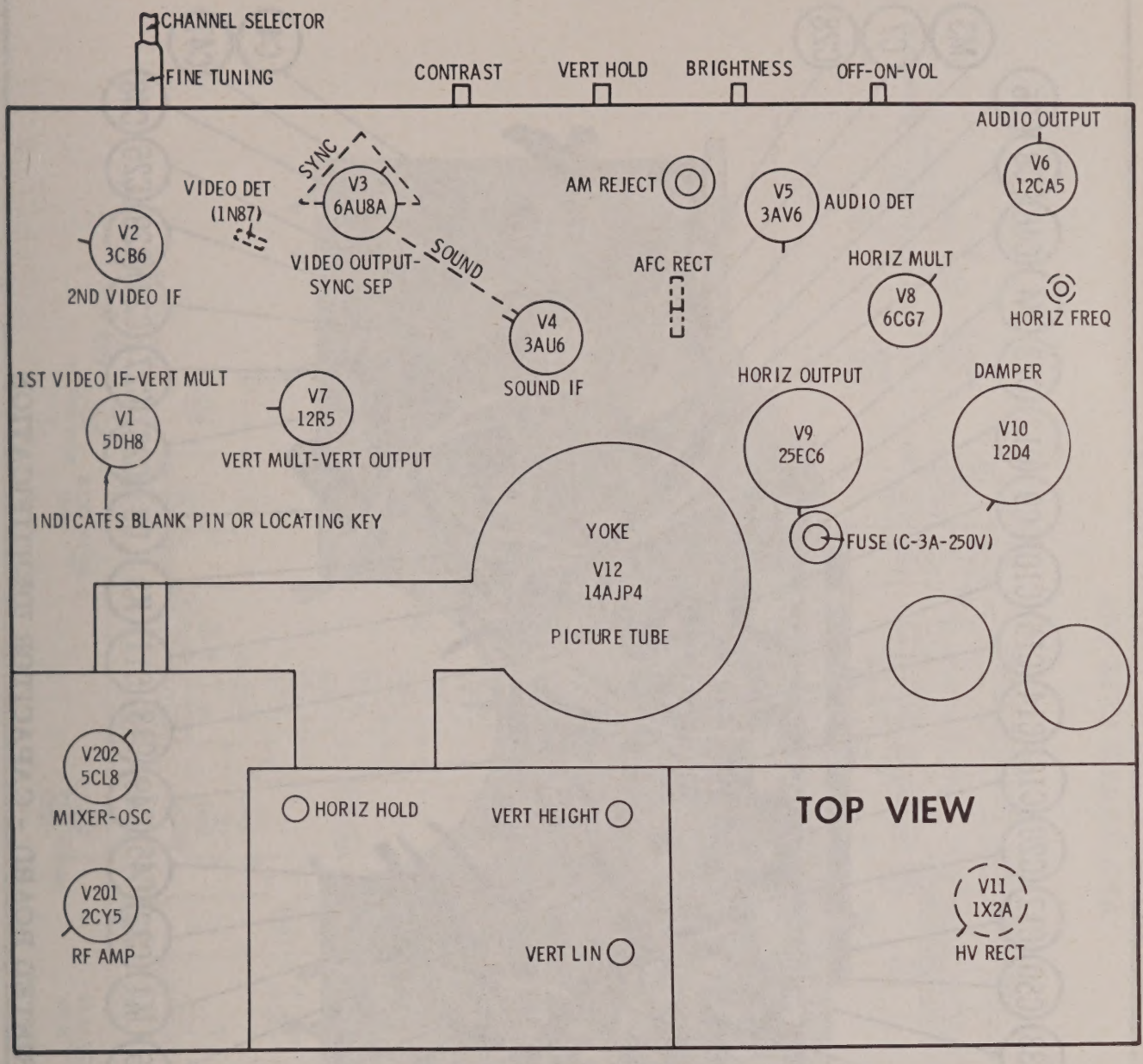
WAVEFORMS TAKEN WITH CONTROLS SET TO PRODUCE 50 VOLTS PEAK-TO-PEAK SIGNAL AT PICTURE TUBE.

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltage measured at 1000 ohms per volt.
2. Pin numbers are counted in clockwise direction on bottom of socket
3. Measured values are from socket pin to common negative unless otherwise stated
4. Line Voltage maintained at 117 volts for voltage readings.
5. All controls set for normal operation, no signal applied.

A PHOTOFACT STANDARD NOTATION SCHEMATIC
© Howard W. Sams & Co., Inc. 1958

GENERAL ELECTRIC MODELS
14P1208, 14P1215, 14P1216 & UHF (Q3 Line

TUBE PLACEMENT CHART



TUBE FAILURE CHECK CHART

The following chart lists tubes whose failures are most likely to produce indicated symptoms. Refer to tube placement chart for location and type of tube.

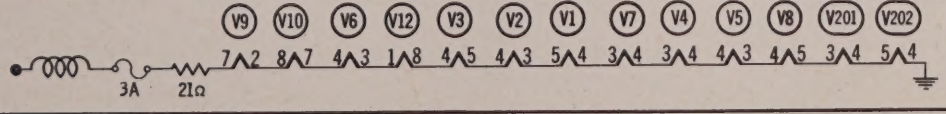
POWER SUPPLY FAILURE
No raster, no sound Fuse (M2), Rectifier (M1)

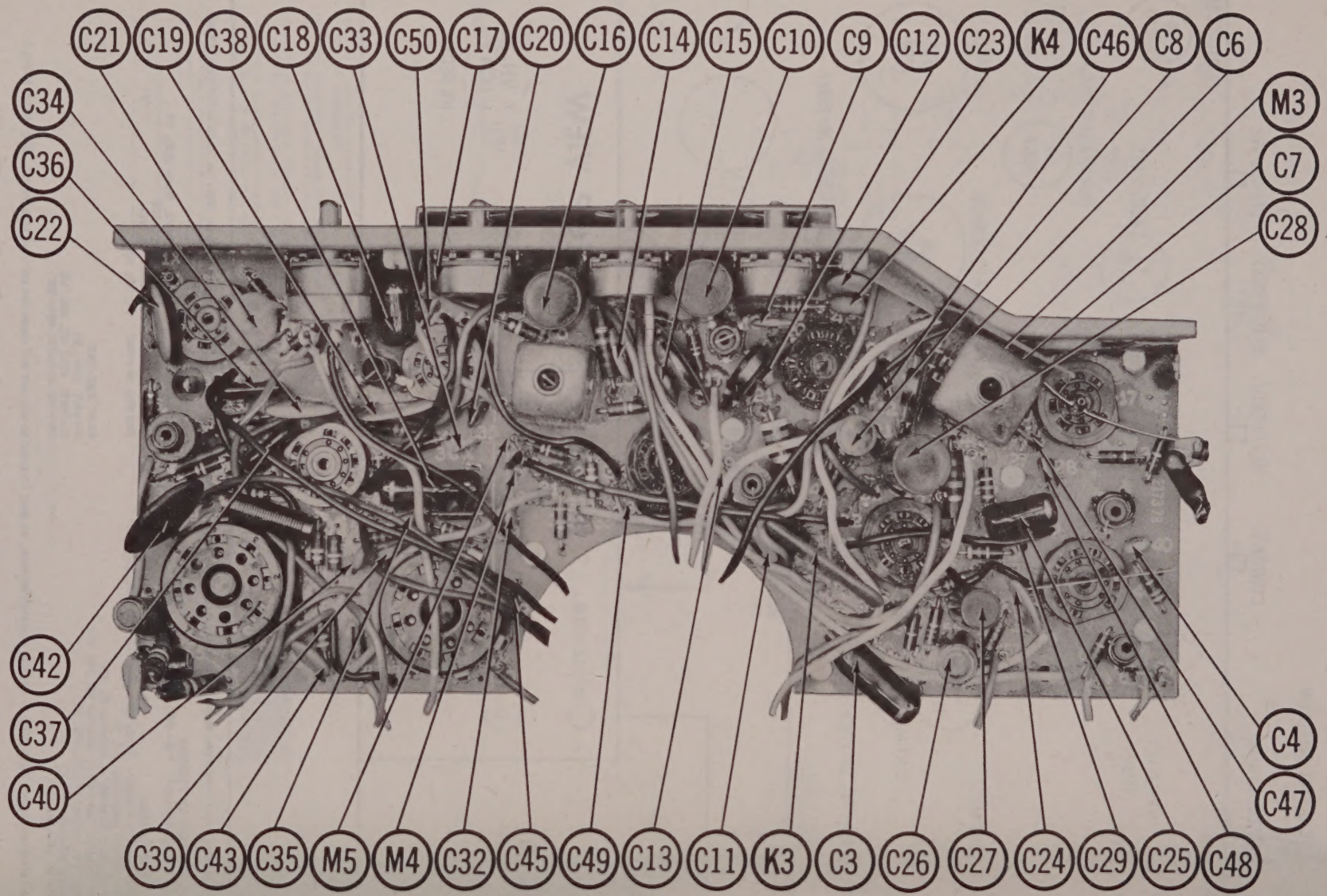
SWEEP FAILURE
No raster, has sound Diode (M4, M5), V8, V9, V10, V11, V12
No vertical deflection V1, V7
Poor vert. linearity or foldover V1, V7
Poor horiz. linearity or foldover V8, V9, V10
Narrow picture V8, V9, V10, M1
Vert. off freq. V1, V7
Horiz. off freq. V8

LOSS OF PICTURE OR SOUND
No pic, no sound, has raster V1, V2, Diode (M3), V3
No pic, no sound, has snow V201, V202
No pic, has sound, has raster V3, V12
Has pic, no sound V4, V5, V6

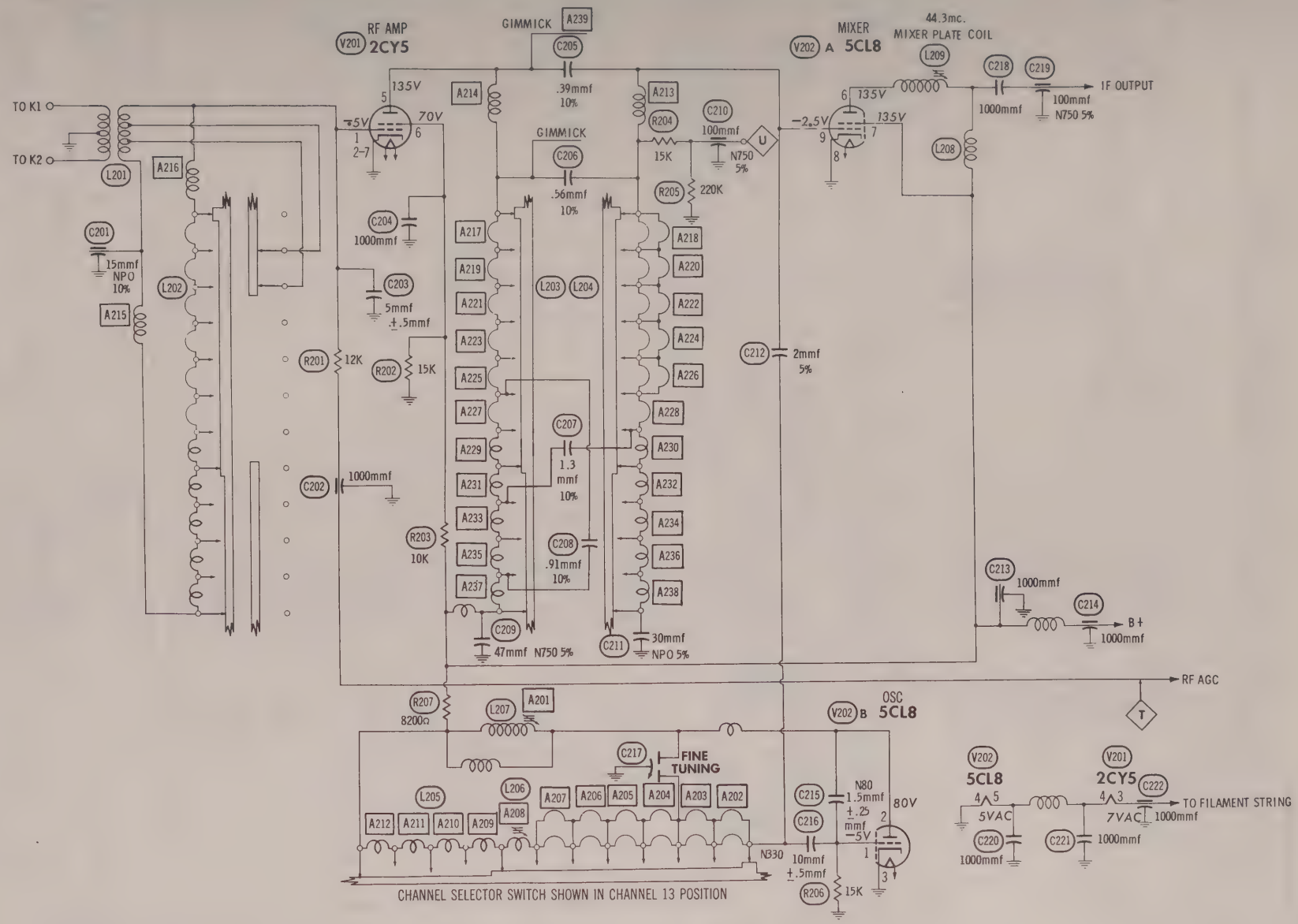
SYNC FAILURE
No vert. sync V3
No horiz. sync V3, M4, M5
No vert. or horiz. sync V3

This receiver employs tubes used in a series filament network, an open filament in any tube will cause the set to be inoperative. (See circuit below.)





PRINTED BOARD - CAPACITOR IDENTIFICATION



A PHOTOFACT STANDARD NOTATION SCHEMATIC

©Howard W. Sams & Co., Inc. 1958

VHF TUNER #RJX-097

GENERAL ELECTRIC MODELS
14P1208, 14P1215, 14P1216 & UHF (G3 Line)

TUNER ALIGNMENT INSTRUCTIONS

PRE-ALIGNMENT INSTRUCTIONS FOR TUNER #RJX-097

USE AN ISOLATION TRANSFORMER TO PROTECT THE TEST EQUIPMENT.
The High Voltage lead should be securely taped and kept away from the chassis.
Allow a 20 minute warm-up period for the receiver and test equipment.

OSCILLATOR ALIGNMENT

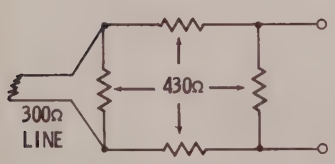
Connect variable bias to IF AGC line. Adjust bias to obtain response curve which shows no indication of overloading.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
Set the Fine Tuning to the center of its range.
Use only enough sweep generator output to provide a usable pattern on scope.
Use 10MC sweep unless otherwise noted.
Coils not containing adjustable cores are adjusted by expanding or compressing coil turns.

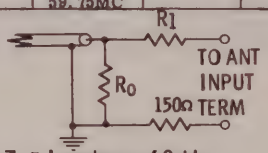
	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
1.	Fig. 201	Across antenna terminals thru matching network (Fig. 201).	213MC	211.25MC	13	Vert. Amp. thru 47K across Video Det. load.	A201	Adjust to place video marker at 50% as in Fig. 202.
			207MC	205.25MC	12		A202	
			201MC	199.25MC	11		A203	
			195MC	193.25MC	10		A204	
			189MC	187.25MC	9		A205	
			183MC	181.25MC	8		A206	
			177MC	175.25MC	7		A207	
			85MC	83.25MC	6		A208	
			79MC	77.25MC	5		A209	
			69MC	67.25MC	4		A210	
			63MC	61.25MC	3		A211	
			57MC	55.25MC	2		A212	

RF AND MIXER ALIGNMENT

Connect the negative lead of a 3 volt bias supply to point (T). Positive to chassis.
Disconnect the link from the tuner output leaving the ground wire connected. Connect a 100Ω resistor from the tuner output to chassis.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
Use only enough sweep generator output to provide a usable pattern on scope.
Use 10MC sweep unless otherwise noted.
Coils not containing adjustable cores are adjusted by expanding or compressing coil turns.
When making the following adjustments, it may be necessary to change bandwidth. This is accomplished by changing position of the "Gimmick" (A239) with respect to the adjacent capacitor.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
2.	Fig. 201	Across antenna terminals thru matching network (Fig. 201).	213MC	211.25MC 215.75MC	13	Vert. Amp. thru 10K to point (U). Low side to chassis.	A213, A214, A215, A216	Adjust in numerical order for maximum gain and symmetry similar to Fig. 203. Adjust first coil for proper frequency and second coil for proper tilt.
3.	"	"	207MC	205.25MC 209.75MC	12	"	A217, A218	"
4.	"	"	201MC	199.25MC 203.75MC	11	"	A219, A220	"
5.	"	"	195MC	193.25MC 197.75MC	10	"	A221, A222	"
6.	"	"	189MC	187.25MC 191.75MC	9	"	A223, A224	"
7.	"	"	183MC	181.25MC 185.75MC	8	"	A225, A226	"
8.	"	"	177MC	175.25MC 179.75MC	7	"	A227, A228	"
9.	"	"	85MC	83.25MC 87.75MC	6	"	A229, A230	"
10.	"	"	79MC	77.25MC 81.75MC	5	"	A231, A232	"
11.	"	"	69MC	67.25MC 71.75MC	4	"	A233, A234	"
12.	"	"	63MC	61.25MC 65.75MC	3	"	A235, A236	"
13.	"	"	57MC	55.25MC 59.75MC	2	"	A237, A238	"





Zo = Impedance of Cable

Z_0	R_0	R_1
50Ω	56Ω	120Ω
72Ω	82Ω	110Ω
92Ω	110Ω	100Ω

FIG. 201

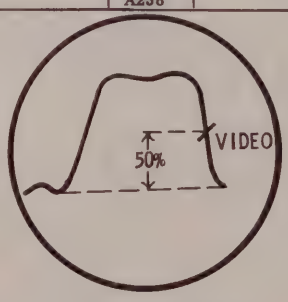
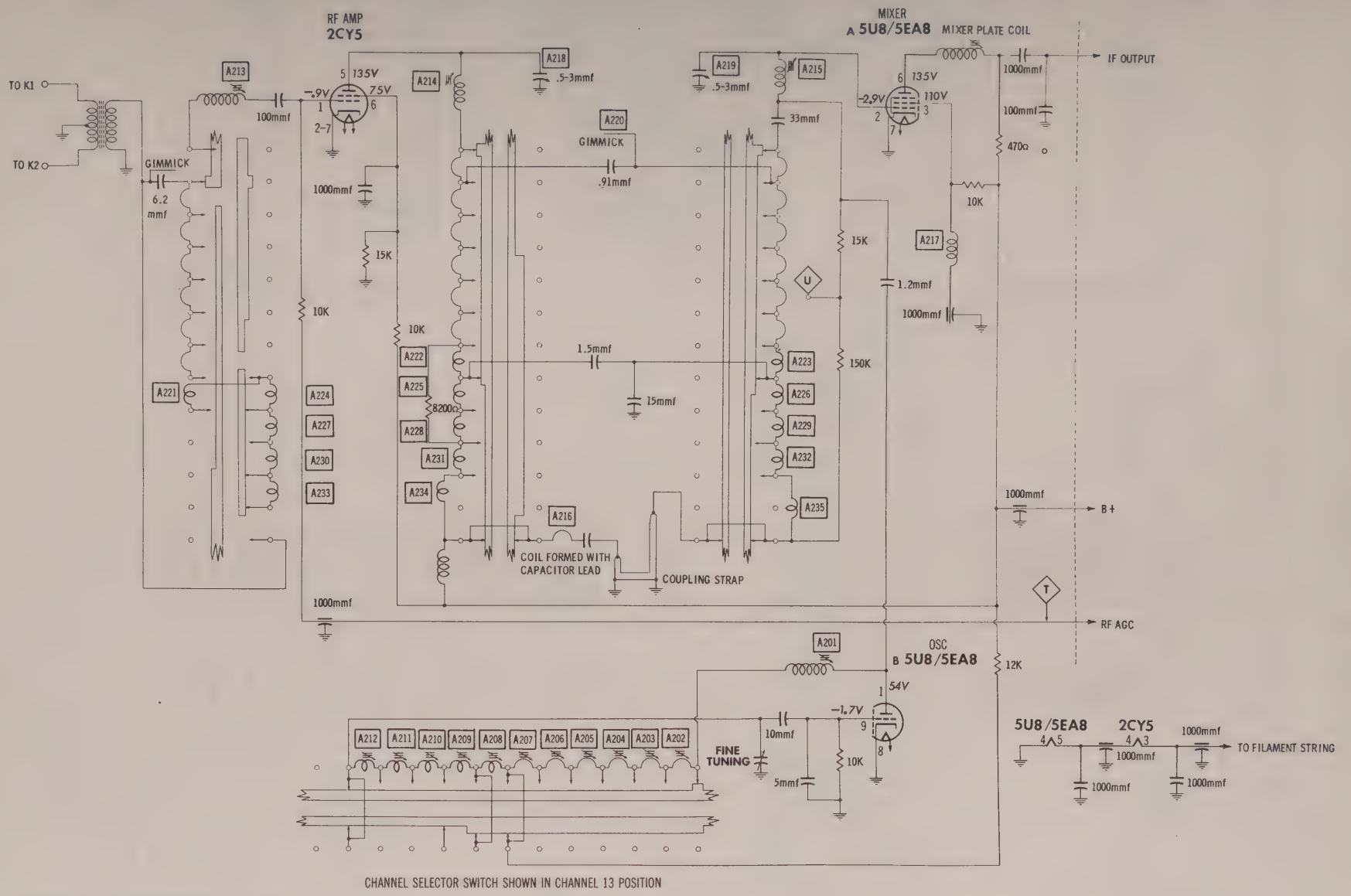


FIG. 202

FIG. 203



CHANNEL SELECTOR SWITCH SHOWN IN CHANNEL 13 POSITION

A PHOTOFACT STANDARD NOTATION SCHEMATIC
Howard W. Sams & Co., Inc. 1958

VHF TUNER #RJX-099

GENERAL ELECTRIC MODELS
14P1208, 14P1215, 14P1216 & UHF (Q3 Line)

TUNER ALIGNMENT INSTRUCTIONS

PRE-ALIGNMENT INSTRUCTIONS FOR TUNERS #RJX-099, #RJX-100

USE AN ISOLATION TRANSFORMER TO PROTECT THE TEST EQUIPMENT .
The High Voltage lead should be securely taped and kept away from the chassis.
Allow a 20 minute warm-up period for the receiver and test equipment.

VHF OSCILLATOR ALIGNMENT

Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
Connect variable bias to IF AGC line. Adjust bias to obtain response curve which shows no indication of overloading.
Set the Fine Tuning to the center of its range.
Use only enough sweep generator output to provide a usable pattern on scope.
Use 10MC sweep unless otherwise noted.
Coils not containing adjustable cores are adjusted by expanding or compressing coil turns.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
1.	Fig. 201	Across antenna terminals thru matching network (Fig. 201).	213MC	211.25MC	13	Vert. Amp. thru 47K across video det. load.	A201	Adjust to place sound marker in trap notch as in Fig. 202.
			207MC	205.25MC	12		A202	
			201MC	199.25MC	11		A203	
			195MC	193 25MC	10		A204	
			189MC	187.25MC	9		A205	
			183MC	181.25MC	8		A206	
			177MC	175.25MC	7		A207	
			85MC	83.25MC	6		A208	
			79MC	77.25MC	5		A209	
			69MC	67.25MC	4		A210	
			63MC	61.25MC	3		A211	
			57MC	55.25MC	2		A212	

VHF RF AND MIXER ALIGNMENT

Connect the negative lead of a 3 volt bias supply to point (T). Positive to chassis.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
Use only enough sweep generator output to provide a usable pattern on scope.
Use 10MC sweep unless otherwise noted.
Coils not containing adjustable cores are adjusted by expanding or compressing coil turns.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
2.	Fig. 201	Across VHF antenna terminals thru matching network (Fig. 201).	213MC	211.25MC 215.75MC	13	Vert. Amp. thru 10K to point (U). Low side to chassis.	A213, A214, A215, A216, A217	Adjust for maximum gain and symmetry similar to Fig. 203 with markers as shown. Adjust bandwidth by changing position of A216 with respect to capacitor. If dip is excessive, adjust A217 only SLIGHTLY to prevent loss of gain.
3.	"	"	177MC	175.25MC 179.75MC	7	"	A218, A219, A220	Adjust for maximum gain and symmetry of response similar to Fig. 203 with markers as shown . Adjust bandwidth by repositioning the "Gimmick" wire (A220) with respect to adjacent capacitor. Recheck step 2.
4.	"	"	207MC	205.25MC 209.75MC	12	"		Check for correct tilt on each channel. If necessary make compromise adjustments of A218 and A219 for best tilt on all channels.
			201MC	199.25MC 203.75MC	11			
			195MC	193.25MC 197.75MC	10			
			189MC	187.25MC 191.75MC	9			
			183MC	181.25MC 185.75MC	8			
5.	"	"	85MC	83.25MC 87.75MC	6	"	A221, A222, A223	Adjust for maximum gain and symmetry of response similar to Fig. 203 with markers as shown.
6.	"	"	79MC	77.25MC 81.75MC	5	"	A224, A225, A226	Check tracking. Adjust for proper response if necessary.
7.	"	"	69MC	67.25MC 71.75MC	4	"	A227, A228, A229	"
8.	"	"	63MC	61.25MC 65.75MC	3		A230, A231, A232	"
9.	"	"	57MC	55.25MC 59.75MC	2	"	A233, A234, A235	"

ALIGNMENT INSTRUCTIONS

PRE-ALIGNMENT INSTRUCTIONS

USE AN ISOLATION TRANSFORMER TO PROTECT THE TEST EQUIPMENT.
The High Voltage lead should be securely taped and kept away from the chassis.
Allow a 20 minute warm-up period for the receiver and test equipment.

VIDEO IF ALIGNMENT

Turn the Volume fully counterclockwise and the Contrast fully clockwise.
Connect the negative lead of a 3 volt bias supply to point (A). Positive to chassis.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.
Use only enough generator output to provide a usable indication on VTVM.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
1.	Direct	High side to ungrounded tube shield floating over Mixer-Osc. tube (V202). Low side to chassis.	44.3MC (Unmod)	Any non-interfering channel	DC probe thru 22K to point (B). Common to chassis. (Across Video Detector Load)	A1 & Mixer Plate Coil	Adjust for maximum deflection.
2.	"	"	45.3MC	"	"	A2	"
3.	"	"	43.3MC	"	"	A3	"

OVERALL VIDEO IF RESPONSE CHECK

Connect bias as under "Video IF Alignment".
Calibrate scope to produce 2 inches of deflection from 3 volts of signal.
Adjust sweep output to produce 2 inches of deflection on the scope at all times.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
4.	Direct	High side to ungrounded tube shield floating over Mixer-Osc. tube (V202). Low side to chassis.	44.3MC (10MC Swp)	41.25MC 42.85MC 44.3MC 45.0MC 45.75MC	Any non-interfering channel	Vert. Amp. thru 22K to point (B). Low side to chassis. (Across Video Det. Load)		Check for response similar to Fig. 1 with markers as indicated. If necessary, retouch A3 to place 42.85MC marker at 40%, A2 to place 45.75MC at 40%, and A1 and Mixer Plate Coil for peak region symmetry. The 41.25MC marker is very critical and should be kept between 4% and 6%.

4.5MC TRAP ALIGNMENT

Set the Contrast fully clockwise.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
5.	.001mfd	High side to point (B). Low side to chassis.	4.5MC (400∿ 30% AM Mod)	Any non-interfering channel	High side thru detector network (Fig. 2) to point (C). Low side to chassis.	A4	Adjust for MINIMUM deflection.

SOUND IF ALIGNMENT

Set the AM Reject to the center of its mechanical range.
Set the Volume fully clockwise.
If a 4.5MC generator of crystal accuracy is not available, a TV station signal may be substituted.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
6.	.001mfd	High side to point (B). Low side to chassis.	4.5MC (400∿ FM Mod. 50KC Swp)	Any non-interfering channel	Across voice coil of speaker	A5	Adjust for maximum 400∿ indication. Peak with slug nearest printed board.
7.	"	"	"	"	"	A6	Adjust for maximum 400∿ on scope.
8.	"	"	"	"	"	A7	Adjust for maximum 400∿ on scope. Peak with slug farthest away from printed board. Repeat steps 6, 7 and 8.
9.	Connect antenna leads to antenna terminals and tune in a strong TV signal. Select the channel which exhibits the most buzz when tuned SLIGHTLY into audio. Set Fine Tuning to a point in audio where the picture is still in sync. This will amplify any existing buzz that is present. Adjust the AM Reject (R7) for MINIMUM buzz. If no buzz is present regardless of Fine Tuning position, leave control at center of rotation. Never set R7 fully clockwise and leave it there.						

TUNER ALIGNMENT INSTRUCTIONS LOCATED ON PAGES 6, 8 & 13.

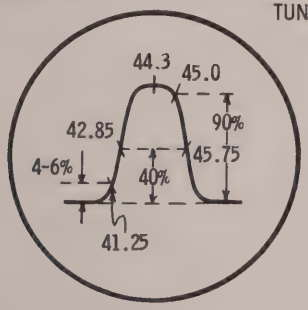


FIG. 1

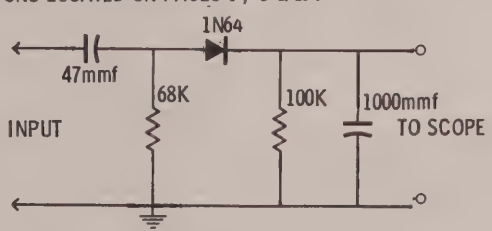


FIG. 2

PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No	USE	TYPE	NOTES
V1	1st Video IF Amp. - Vert. Mult	3DH8	
V2	2nd Video IF Amp.	3CB8	
V3	Video Output-Sync Sep.	6AU8A	
V4	Sound IF Amp.	3AU8	
V5	Audio Detector	3AV8	
V6	Audio Output	12CA5	
V7	Vert. Mult - Vert. Output	12R5	
V8	Horiz. Mult.	6CG7	
V9	Horiz. Output	25EC8	
V10	Damper	12D4	
V11	HV Rectifier	1X2A	

PICTURE TUBE

ITEM No.	REPLACEMENT DATA				NOTES
	G E PART No.	GENERAL ELECTRIC PART No	RCA PART No.	SYLVANIA PART No.	
V12	14AJP4	14AJP4 ①		14AJP4 ②	① "Aluminized" ② "Silver Screen 65"

ELECTROLYTIC CAPACITORS

ITEM No	RATING		REPLACEMENT DATA						
	CAP	VOLT	G.E. PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No	PYRAMID PART No	SANGAMO PART No	SPRAGUE PART No.
C1	375	165	WT31X256	AFH1-24-95	XB0189				PLC-1640
C2A	▲290	150	WT31X257	AFH4-23-72		FP408.7			R249L *
B	▲10	150							
C	▲30	150							
D	100	10							

* Non-catalog item.

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA							NOTES
	CAP.	VOLT	G. E. PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.		
C3	.1	600	WT25X24	P688N-1	DF-104	CUB6P1	GEM-601	6TM-P1		
C4	270		RCW-3327		DS-271	L10T27		MS-327		10%
C5	820		RCW-3262			1R5T82		MS-382		10%
C6	1 ▲		RCW-3332							NPO ± .25mmf
C7	5		RCW-3057		DTZ-4R7					NPO 5%
C8	.047	200	RCB-015							10%
C9	33		RCW-3189		DTZ-33					NPO 5%
C10	.1	600	RCB-036							10%
C11	5000		RCW-3321	BPD-006	DD-502	BYA10D5	DC535	5HK-D5		
C12	5		RCW-3067		DTZ-4R7					NPO 5%
C13	30		RCW-3171		DTZ-30					NPO 5%
C14	2200		RCW-3248			1R5D22				10%
C15	5000		RCW-3014	BPD-005	DD-502	BYA10D5	DC535	5HK-D5		
C16	.15	400	RCB-023	P488N-15		BCSP15J		4SE-P15		
C17	100		WT19X80	1469-0001	DD-101	2SR5T1	MCB255	MS-31		10%
C18	.047	200	WT25X33	P388N-047	DF-503	CUB3S47	GEM-6147	2TM-S47		
C19	150		WT18X95							N150 10%
C20	680		RCW-3337		D6-681	1R5T68		MS-368		10%
C21	10000		RCW-3186	BPD-01	DD-103	BYA85I	DC5II	5HK-S1		
C22	10000		RCW-3366	BPD-01	DD-103	BYA85I	DC5II	5HK-S1		
C23	5000		RCW-3321	BPD-005	DD-502	BYA10D5	DC535	5HK-D5		
C24	3300		RCW-3300			1R5D33		MS-233		10%
C25	.027	200	WT25X31							10%
C26	.015	600	RCB-013							10%
C27	.047	200	RCB-015							10%
C28	.047	1000	RCB-046							10%
C29	800		RCW-3037							
C30	.01	1000		P1088N-01		CUB10S1	GEM-1011	10TM-S1		
C31	.01	1000		P1088N-01		CUB10S1	GEM-1011	10TM-S1		
C32	1300		RCW-3187			1R5D13		MS-213		10%
C33	830		RCW-3283			1R5T83		MS-383		10%
C34	10000		RCW-3304							10%
C35	.1	600	WT25X24	P688N-1	DF-104	CUB6P1	GEM-601	6TM-P1		
C36	2200		WT18X63	1464-0022		1R5D22		MS-222		10%
C37	1000		WT18X39	1464-001		1R5D1	MCE355	MS-21		5%
C38	39			N750-SI 39	TCN-39	C10CS9U				N750 10% ①
C39	3900		RCW-3185			1R5D39		MS-239		10%
C40	300		RCW-3236		D6-301	L10T3		MS-33		10%
C41	.15	600		P688N-15		CUB6P15	GEM-6015	6TM-P15		
C42	570	3000	WT18X364							N1200 10%
C43	1300		RCW-3187			1R5D13		MS-213		10%
C44	500	15000	RCW-3325	UV-502	TV-20	MMU200T5	HV30035A	20DK-T5		
C45	800		RCW-3037							
C46	800		RCW-3037							
C47	800		RCW-3037							
C48	800		RCW-3037							
C49	800		RCW-3037							
C50	800		WT18X84							
C51	1000	1000	RCW-3329	HVD-15-1000	DD-102		DC502I	BL-DI0		
C52	.01	600	WT36X8	P688N-01	D6-103	CUB6S1	GEM-611	6TM-S1		
C53	10000	1400	WT18X280	DAC-27	DD80-103	HVB16D1		BL-DI0		
C54	1000	1400	RCW-3331	DAC-2	DD80-102	HVB16D1	DC502I	BL-DI0		
C55	1000	1400	RCW-3331	DAC-2	DD80-102	HVB16D1	DC502I	BL-DI0		
C56	1000	1400	RCW-3331	DAC-2	DD80-102	HVB16D1	DC502I	BL-DI0		
C57	800		RCW-3037	BPD-0008	DD-801	L10T8		SOA-T8		
C58	2		RCW-3082							NPO ± .25mmf

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	G. E. PART No.	CENTRALAB PART No	CLAROSTAT PART No.	IRC PART No	MALLORY PART No.	
R1	500K	½	WT49X267					Volume & Switch
R2	300K	½	RRC-427					Brightness
R3	1.5meg	½	RRC-402					Vert. Hold
R4	12K	½	RRC-426					Contrast
R5A	1meg	½	RRC-395	AB-69	A47-1meg-S	QH-137	PTA1254L	Horiz. Hold
B	Shaft			AK-19	RN-3	TQ	Not Req.	
R8A	5meg	½	WT49X268					Vert. Lin.
B	400K	½						Height
R7	3000Ω	2(WW)	RRC-305		39-3000		FL-2.5K	AM Reject.

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING		G. E PART No.	NOTES
	OHMS	WATT		
R8	2 2meg			
R9	20meg 5%			
R10	22Ω			
R11	8200Ω			
R12	560Ω			
R13	47Ω			
R14	220Ω			
R15	56Ω			
R16	180K			
R17	4700Ω			
R18	1meg			
R19	4700Ω	2		
R20	82Ω			
R21	27K			
R22	5600Ω			
R23	220K			
R24	18meg			
R25	18meg			
R26	390K			
R27	100K			
R28	100K			
R29	12K	1		
R30	100Ω			
R31	12K			
R32	150K			
R33	22K			
R34	10meg			
R35	1meg			
R36	22Ω			
R37	1200			
R38	1.5meg			
R39	33K			
R40	100K			

ITEM No.	RATING		G. E. PART No.	NOTES
	OHMS	WATT		
R41	330K			
R42	1 5meg			
R43	330K			
R44	22K	1		
R45	47K			
R46	2200Ω			
R47	2200Ω			
R48	3300Ω			
R49	47K			
R50	4. 7meg 5%			
R51	75K 5%			
R52	270K			
R53	220K			
R54	1meg			
R55	47K			
R56	15K 5%			
R57	820K			
R58	120K			
R59	150K			
R60	1000Ω 5%			Note 1
R61	1. 5meg			
R62	18K			
R63	470Ω			
R64	220K			
R65	270K	1		
R66	270K	1		
R67	.68Ω		RRW-181	
R68	2Ω	15	WT14X227	
R69	5Ω	10	RRW-170	
R70	680Ω	2		
R71	470K			
R72	820K			Note 2
R73	820K			Note 2

Note 1. Some versions may use 1000Ω 5% in this application.
Note 2. Some versions may use 1meg in this application.

TRANSFORMERS (SWEEP CIRCUITS)

ITEM No.	USE	REPLACEMENT DATA							NOTES
		G. E. PART No.	Halldorson PART No.	Merit PART No.	Ram PART No	Stancor PART No	Thordarson PART No.	Triad PART No.	
T1	Vert. Output	RTO-209	Z1900 ①		V316	A-8147	28S75 ①	A-118X ②	
T2A	Yoke-Horiz. (12. 6MH)	RLD-080							
B	(110°)-Vert. (43MH)				X171 *	HO-298 *			
T3	Horiz. Output	RTO-207-9							
	Alt. Horiz. Output	RTO-207							
	Yoke Clamp	RMX-377							

① Use 6 to 1 turns ratio. Connect as autoformer.
② Use 5.5 to 1 turns ratio.

*HORIZONTAL OUTPUT TRANSFORMER CONNECTION DATA

Use Original Width Coil Unless Replacement Type Is Listed

ORIGINAL TERMINAL CONNECTIONS	Halldorson Replacement Connections	Merit Replacement Connections	Ram Replacement Connections	Stancor Replacement Connections	Thordarson Replacement Connections	Triad Replacement Connections
4			4	4		
5			5	5		
6			6	6		

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA						NOTES
	PRI.	SEC.	G. E. PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T4	3600Ω	3-4Ω	RTO-210	Z1105 ①	A-3018 ①	AU-608 ①	A-3328	24S48	S-6X	① Drill new mounting hole.

SPEAKER

ITEM No.	TYPE			REPLACEMENT DATA		NOTES
	SIZE	FIELD	V. C. IMP.	G. E. PART No.	QUAM PART No.	
SP1	4"	PM	3-4Ω	ROP-035	4A07	

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA						NOTES
		G. E. PART No.	Meissner PART No.	Merit PART No.	Miller PART No.	Ram PART No.		
L1	1st. Video IF	RLI-381						
L2	2nd. Video IF	RTL-215						
L3	3rd. Video IF	RLI-423						Includes L4, L5, L6, L7
L4	RF Choke	RLI-423 †						1.3 Microhenries ①
L5	RF Choke	†						.22 Microhenry
L6	RF Choke	†						31 Microhenries
L7	RF Choke	†						7.5 Microhenries ①
L8	Series Peaking Coil	RLI-450 †						82 Microhenries
L9	4.5MC Trap	WT36X366						
L10	Shunt Peaking Coil	RLI-426						510 Microhenries
L11	Series Peaking Coil	WT36X270	19-3500	TV-188	6174	VP-8		270 Microhenries
L12	1st. Sound IF	WT36X367	19-3250	TV-198	6130	VP-6		
L13	2nd. Sound IF	WT36X368						
L14	3rd. Sound IF	WT36X371						
L15	Discriminator	WT36X369						
L16	RF Choke	RLI-428			4611			8.2 Microhenries
L16	RF Choke	RLI-429			4611			8.2 Microhenries
L17	Line Choke	RLI-420						120 Microhenries

† Part of L8.
① IRC Part #CLA.

TRANSFORMER (HORIZ. OSC.)

ITEM No.	DC RES		REPLACEMENT DATA						NOTES
	PRI.	SEC.	G E PART No.	Meissner PART No.	Merit PART No.	Miller PART No.	Ram PART No.	Thordarson PART No.	
L18	77Ω		RLI-424						

FILTER CHOKE

ITEM No.	RATINGS			REPLACEMENT DATA						
	CURRENT (Measured)	DC RES.	INDUCTANCE (0 CURRENT 1000 ^C)	G. E. PART No.	Halldorson PART No.	Merit PART No	Ram PART No	Stancor PART No.	Thordarson PART No.	Triad PART No
L19	260A	24Ω	.7 Hy.	RLF-078					28C44	C-27X ①

① Drill new mounting hole.

COMPONENT COMBINATIONS

ITEM No	USE	DESCRIPTION	G.E. PART No	REPLACEMENT DATA	
K1	Antenna Isolation	470mmf ② 1500VAC, 3-1meg	RCR-002	Centralab	RC-471
				Sprague	R-9177
K2	Antenna Isolation	470mmf ▲ 1500VAC, 3-1meg	RCR-002	Centralab	RC-471
				Sprague	R-9177
K3	Vert. Integrator	3900mmf, 800mmf, 180mmf, 130mmf, 100K, 68K, 47K, 47K	WT33X19		
K4	Sync	470mmf, 470K	RCR-003	Centralab	RC-465
				Sprague	R-9178
K5	Isolation	4700mmf ▲ 1500VAC, 1meg	RCR-006	Centralab	RC-490
				Sprague	R-9177

RECTIFIERS

ITEM No.	RATING	REPLACEMENT DATA					NOTES
	CURRENT (Measured)	G.E. PART No.	FEDERAL PART No.	GENERAL ELECTRIC PART No.	INTERNATIONAL PART No.	SARKES TARZIAN PART No.	
M1	.300A	RER-031		1N1008 ①		M500 ②	① Germanium type. ② Silicon type.

FUSES

ITEM No.	TYPE	RATING	REPLACEMENT DATA					
			G. E. PART No.		LITTELFUSE PART No.		BUSS PART No.	
			FUSE	HOLDER	FUSE	HOLDER	FUSE	HOLDER
M2	C	3A 250V	WT10X34	WT8X81	312003 (C-3A-250V)	346007	C3	HC 2½ to 3½

CRYSTAL DIODES

ITEM No.	ORIG. TYPE	REPLACEMENT DATA			NOTES
		G. E. PART No.	CBS PART No.	SYLVANIA PART No.	
M3		RED-001	1N80	1N80	Video Det. (Pigtail)
M4		RED-006	1N87A	1N38A	Horiz. AFC (Pigtail)
M5		RED-006	1N87A	1N38A	Horiz. AFC (Pigtail)

MISCELLANEOUS

ITEM No.	PART NAME	G. E. PART No.	NOTES
M6	Tuner	RJX-097	VHF
	Tuner	RJX-099	VHF
	Tuner	WT85X79	VHF
	Tuner	RJX-100	UHF-VHF
	Tuner	WT85X81	UHF
M7	Centering Device	REA-019	
M8	Ion Trap	RET-016	

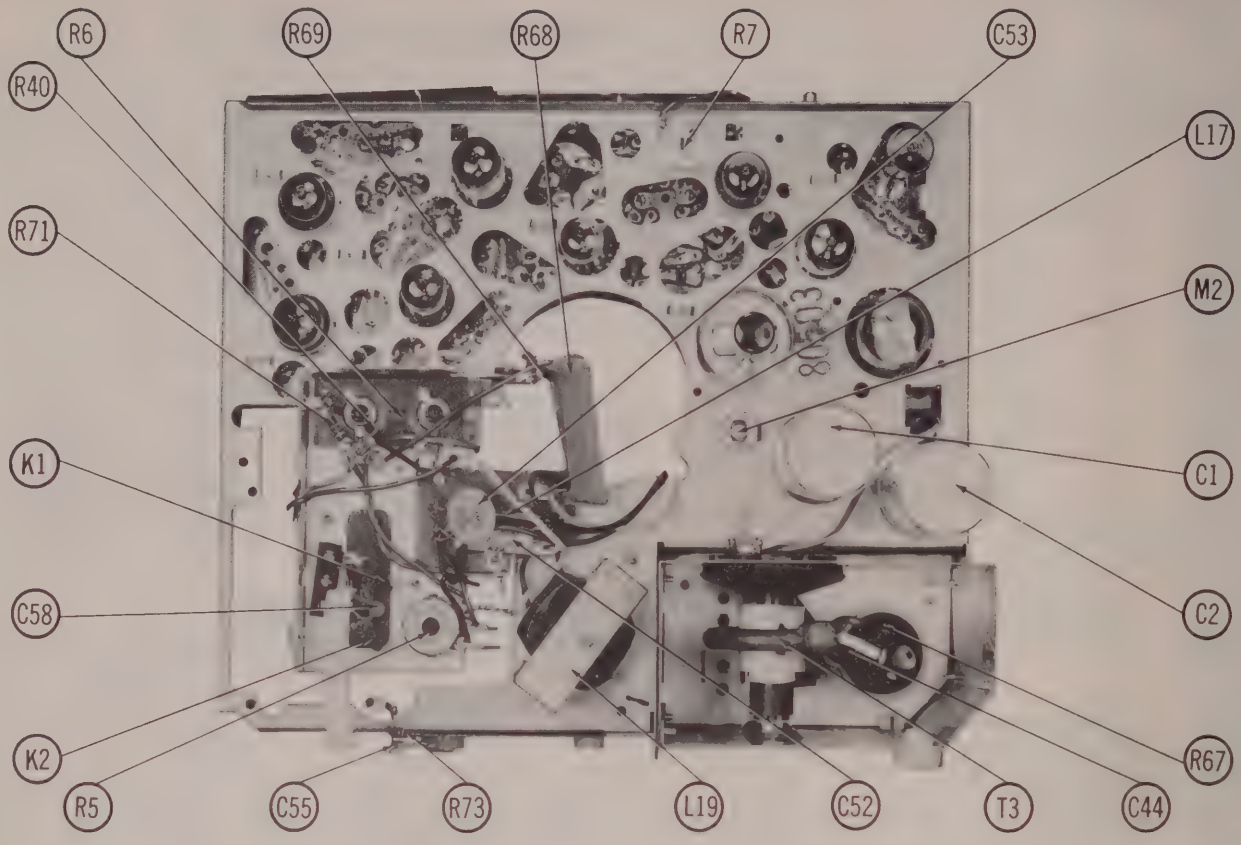
CABINETS & CABINET PARTS

(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

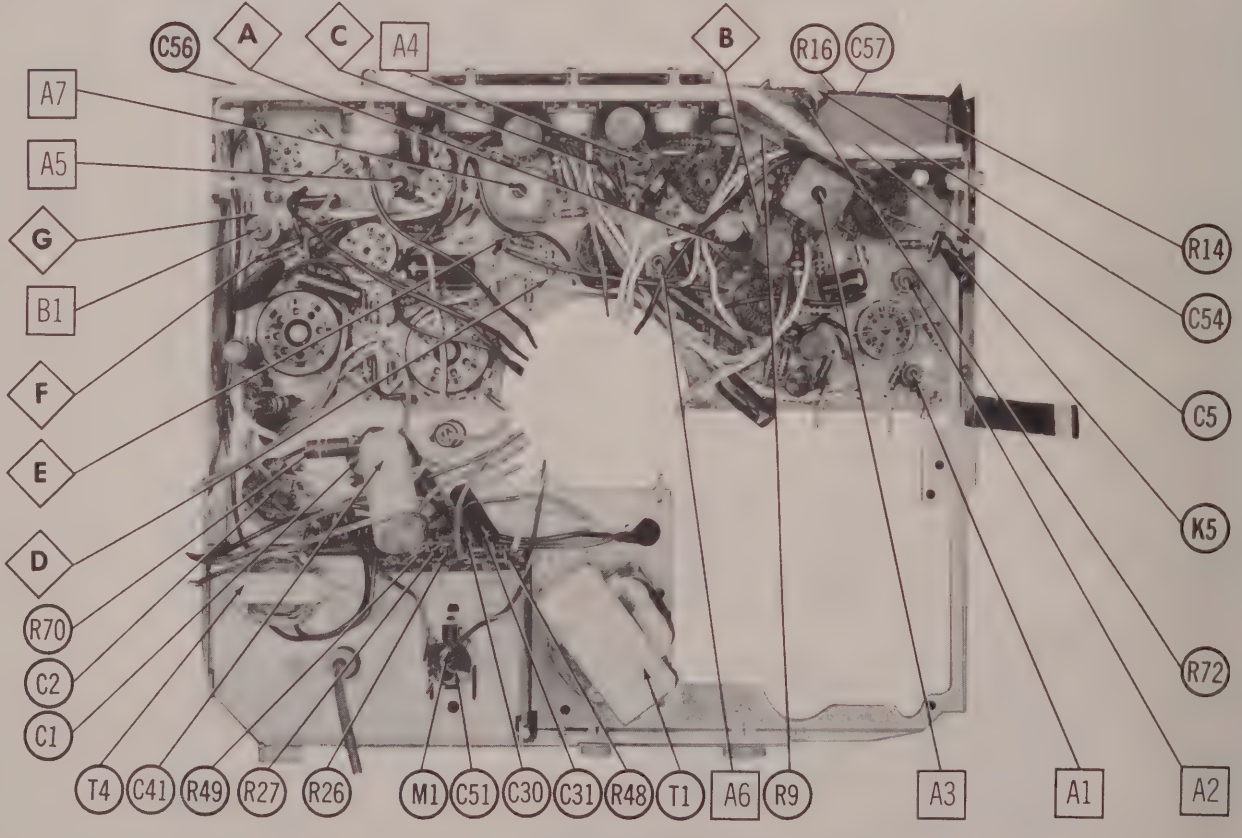
NAME	PART NO.	DESCRIPTION
Safety Glass	WT94X86	Model 14P1208
Safety Glass	RDW-128	Models 14P1215, 14P1216
Knob	RDK-530	Tuning
Knob	WT43X368	VHF Channel Selector
Knob	RDK-659	UHF Dial
Knob	RDK-642	Secondary
Ring	RDO-026	Knob backing
Cabinet	WT99X38	Front, Model 14P1208
Cabinet	WT99X35	Front, Model 14P1215
Cabinet	WT99X39	Front, Model 14P1216
Cabinet	WT103X44	Rear, Model 14P1208
Cabinet	WT103X45	Rear, Model 14P1215
Cabinet	WT103X46	Rear, Model 14P1216
Cabinet	WT98X85	Back, Model 14P1208
Cabinet	WT98X89	Back, Model 14P1215
Cabinet	WT98X88	Back, Model 14P1216
Handle	WT78X58	Models 14P1215, 14P1216

WIRING DATA

High Voltage Lead	Use BELDEN No. 8969
Shielded Hook-up Wire	Use BELDEN No. 8885 (Single Conductor)
	8738 (Two Conductor)
General-use Unshielded Hook-up Wire	Use BELDEN No. 8530 (Solid) Available in Ten Colors
	8524 (Stranded) Available in Ten Colors
Power Cord (Interlock Type)	Use BELDEN No. 8874
300Ω Tuner Input Lead	Use BELDEN No. 8225
300Ω Antenna Lead-in	Use BELDEN No. 8230 or 8275
Antenna Rotor Cable	Use BELDEN No. 8464 (Flat) or 8464 (Round) - 4 Conductor
	8465 (Round) - 5 Conductor
	8466 (Round) - 6 Conductor



CHASSIS TOP VIEW



CHASSIS BOTTOM VIEW

UHF IF ALIGNMENT FOR TUNER #RJX-100

Connect the negative lead of a 3 volt bias supply to point Ⓣ.
Disconnect the IF link from the grid coil of the 1st. Video IF stage and terminate the open end of the cable or link with a 68Ω resistor.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
Use only enough sweep generator output to provide a usable pattern on scope.
Set the VHF tuner to the UHF position and adjust the UHF tuning for MINIMUM tilt of the response curve over the center of the tuning area (approximately 620MC).
Remove Germanium Diode from UHF Tuner.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
10.	Fig. 204	High side to point Ⓥ. Low side to chassis.	43.0MC (10MC Swp)	40.5MC 45.75MC	UHF	Vert. Amp. thru 10K to point Ⓤ. Low side to chassis.	A236, A237, A238, A239	Adjust A236 for maximum amplitude at 40.5 MC, A237 for maximum at 45.75MC and A238 for maximum gain and MINIMUM tilt (See Fig. 205). If necessary, adjust position of "Gimmick" (A239) for MINIMUM dip.

UHF TUNER ALIGNMENT

This portion of the receiver has been properly aligned at the factory and is very stable. Alignment of this portion should not be required in the field.

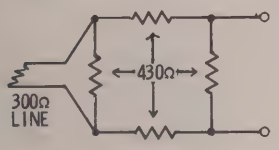
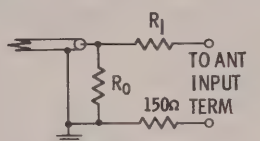


FIG. 201



Z_0	R_0	R_1
50Ω	56Ω	120Ω
72Ω	82Ω	110Ω
92Ω	110Ω	100Ω

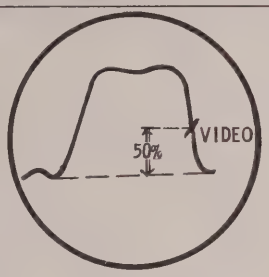


FIG. 202

FIG. 203

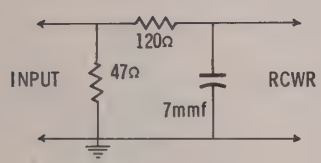


FIG. 204

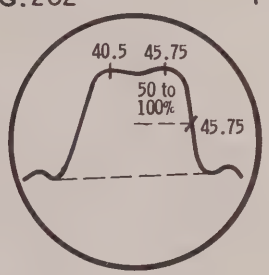
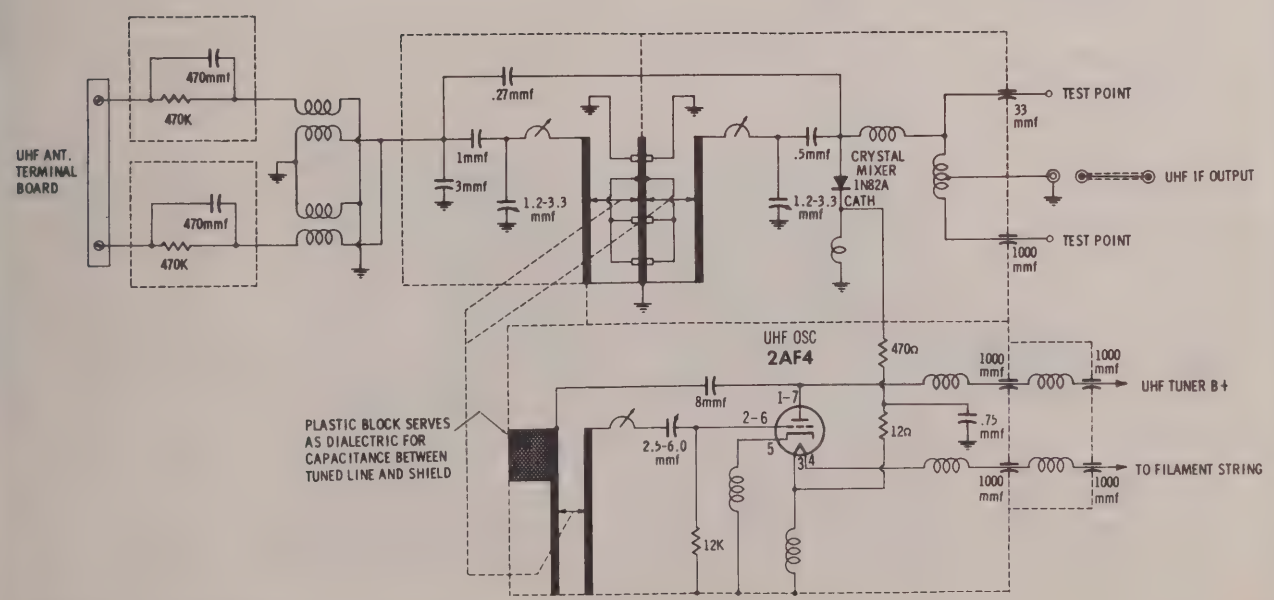


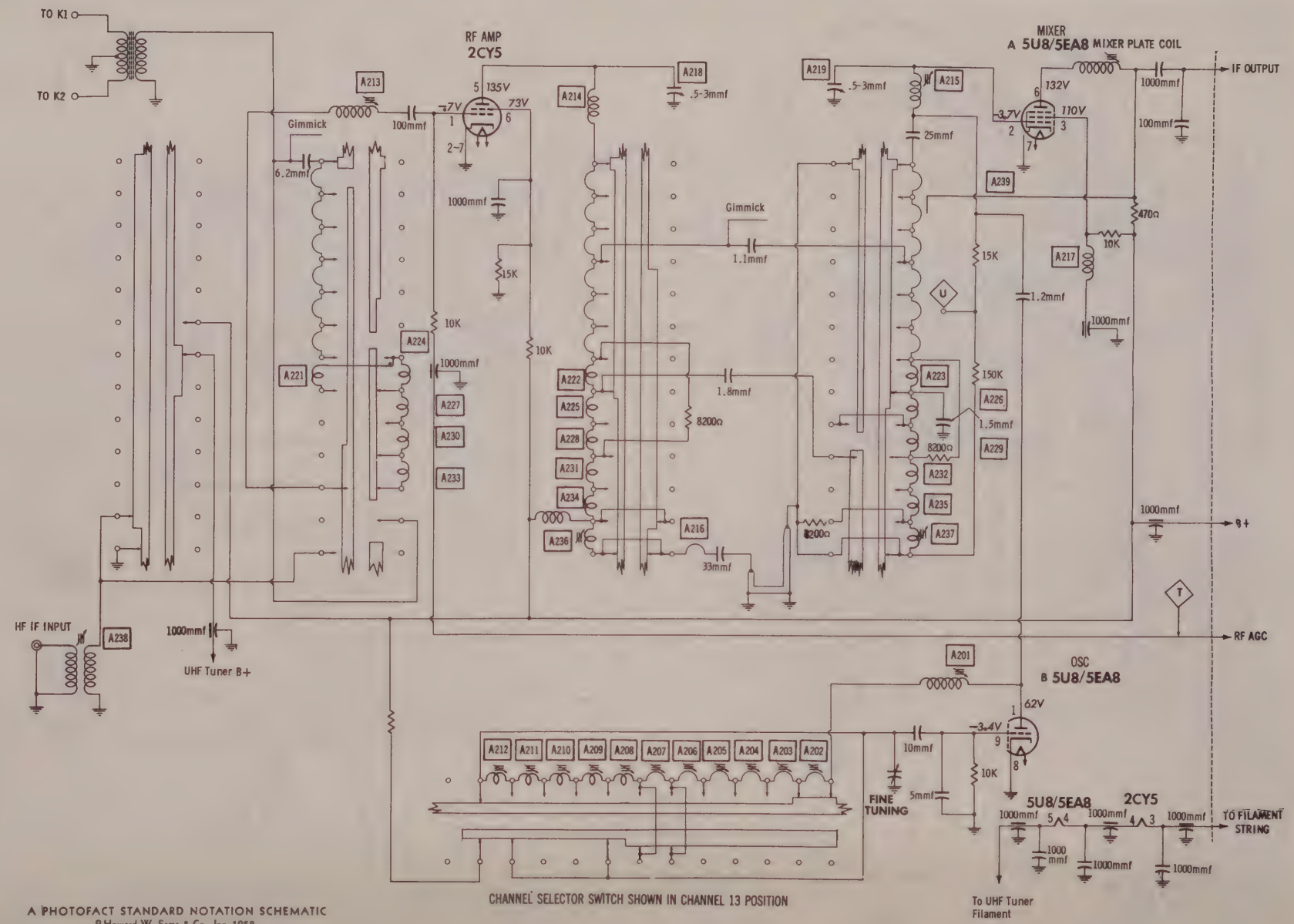
FIG. 205



A PHOTOFACT STANDARD NOTATION SCHEMATIC

© Howard W. Sams & Co., Inc. 1958

UHF TUNER #WT85X21



Tuner #RJX-100 (VHF with UHF provisions)

TUNER PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V201	RF Amplifier	2CY5	

ITEM No.	USE	TYPE	NOTES
V202	Mixer-Osc.	5CL8	

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA						NOTES
	CAP.	VOLT	G.E. PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	
C201	15		RCW-3314						NPO 10%
C202	1000		RCW-3269	EF-001	MFT-1000			503C-D1	
C203	5		RCW-3113		DTZ-4R7				±.5mmf
C204	1000		RCW-3386	BPD-001	DD-102	BYA6D1	DC521	5HK-D1	
C205	.39		RCK-031						10%
C206	.56		RCK-034						10%
C207	1.3		RCK-035						10%
C208	.91		RCK-012						10%
C209	47		RCW-3267		DTN-47				N750 5%
C210	100		RCW-3344						N750 5%
C211	30		RCW-2008						NPO 5%
C212	2		RCK-020						5%
C213	1000		RCW-3269	EF-001	MFT-1000			503C-D1	
C214	1000		RCW-3269	EF-001	MFT-1000			503C-D1	
C215	1.5		RCW-3347						N80 ±.25mmf
C216	10		RCW-3348						N330 ±.5mmf
C217			RCY-097						
C218	1000		RCW-3386	BPD-001	DD-102	BYA6D1	DC521	5HK-D1	
C219	100		RCW-3344						N750 5%
C220	1000		RCW-3386	BPD-001	DD-102	BYA6D1	DC521	5HK-D1	
C221	1000		RCW-3386	BPD-001	DD-102	BYA6D1	DC521	5HK-D1	
C222	1000		RCW-3269	EF-001	MFT-1000			503C-D1	

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

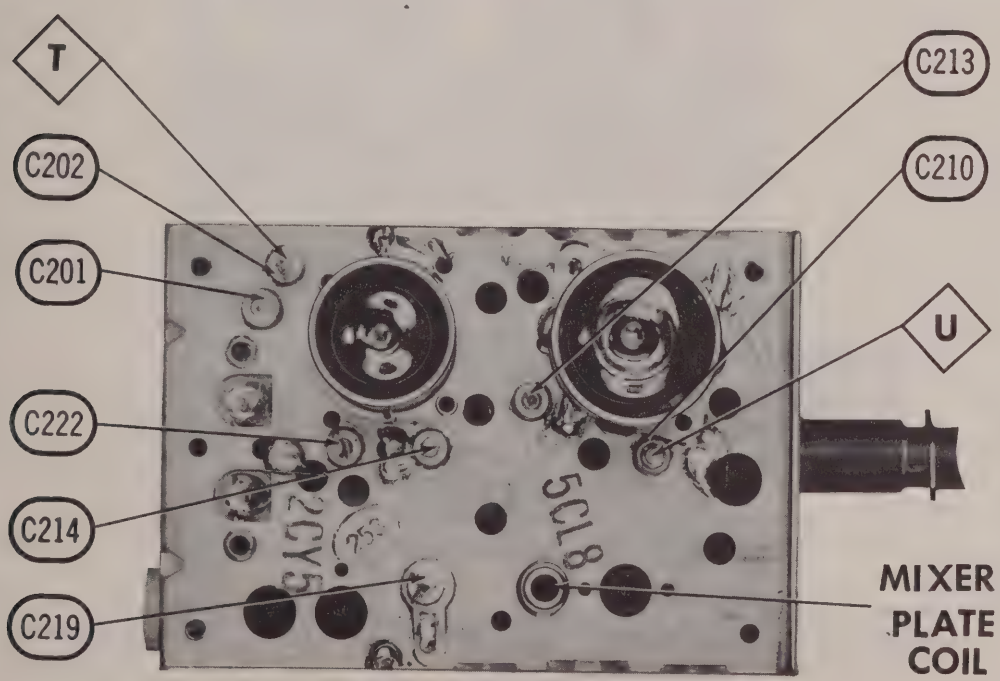
ITEM No.	RATING		G.E. PART No.	NOTES
	OHMS	WATT		
R201	12K			
R202	15K			
R203	10K			
R204	15K			

ITEM No.	RATING		G.E. PART No.	NOTES
	OHMS	WATT		
R205	220K			
R206	15K			
R207	8200Ω			

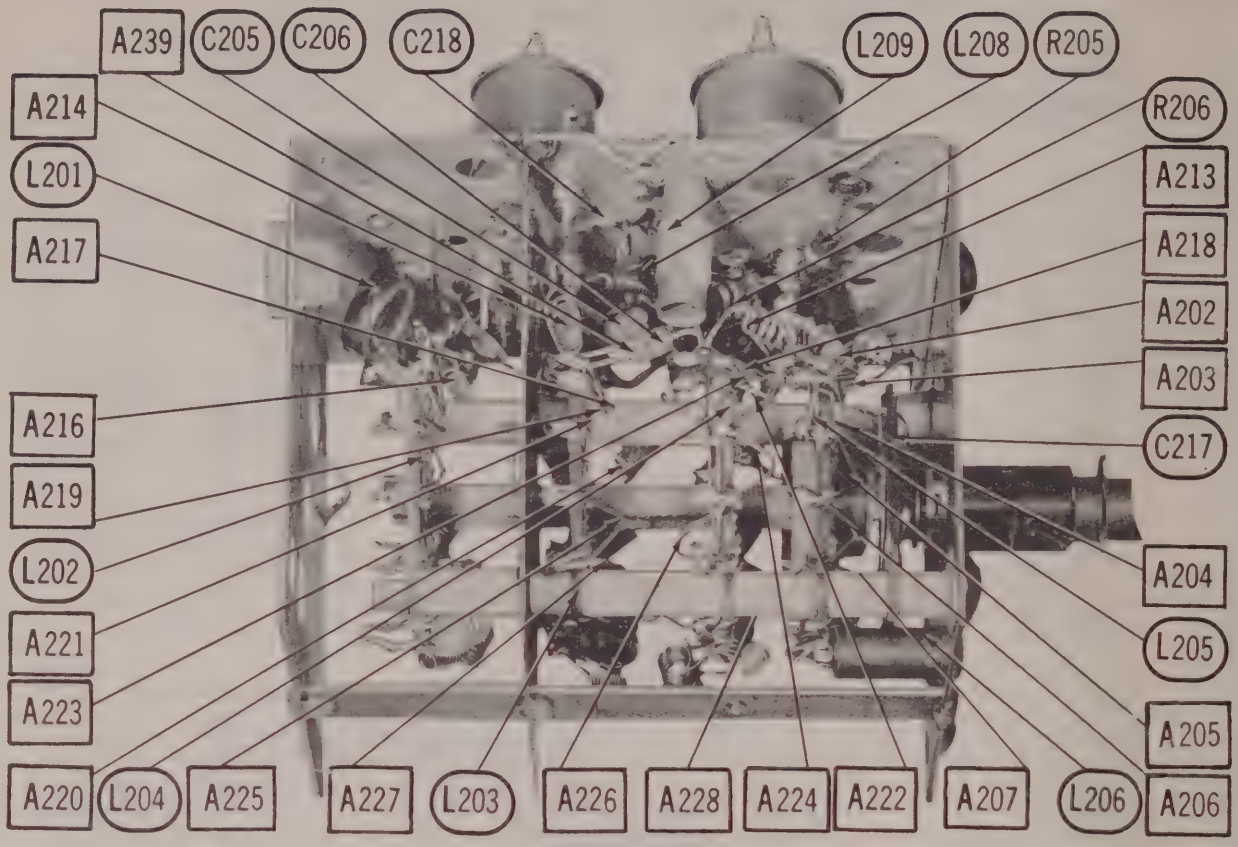
COILS (RF-IF)

ITEM No.	USE	G.E. PART No.	NOTES
L201	Ant. Trans.	RLA-046	
L202	Ant. Coils	RSX-092	Channel 2-13, Wafer Ass'y.
L203	RF Coils	RSX-093	Channel 2-13, Wafer Ass'y.
L204	Mixer Grid Coils	RSX-094	Channel 2-13, Wafer Ass'y.

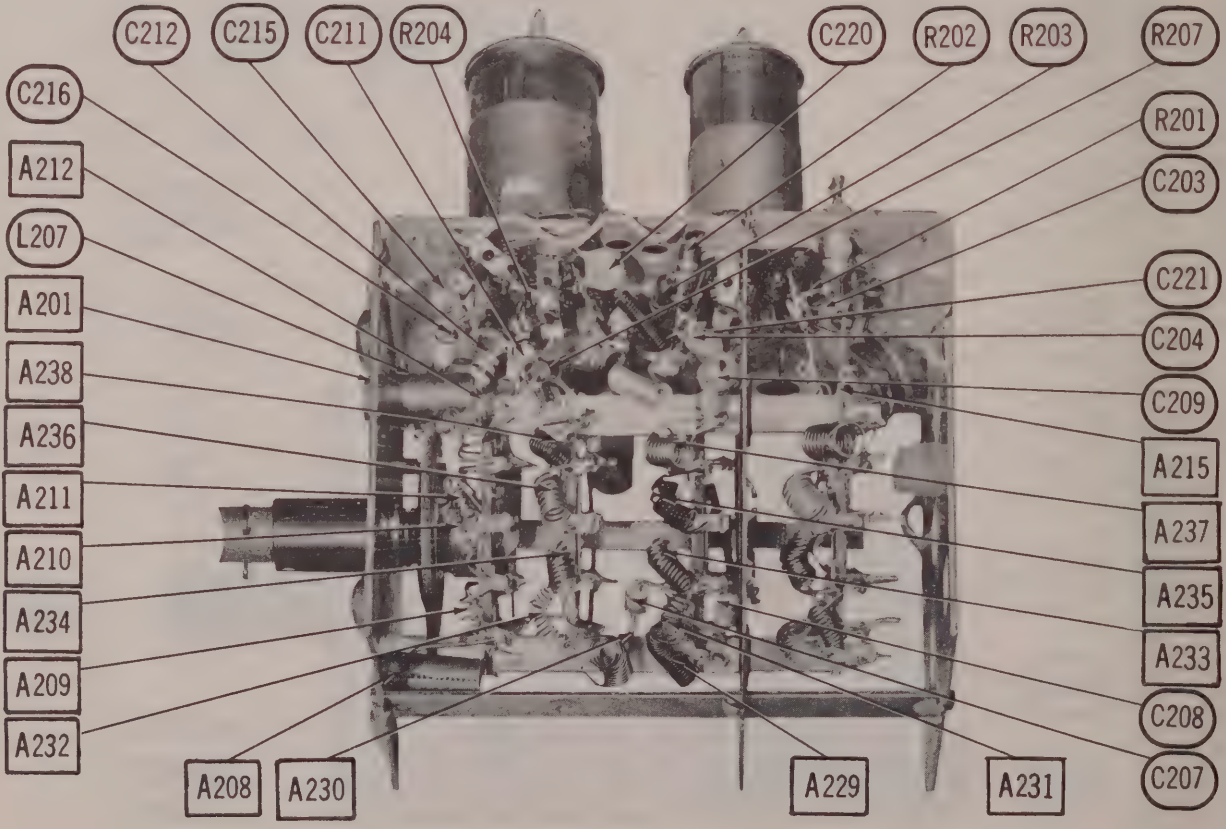
ITEM No.	USE	G.E. PART No.	NOTES
L205	Osc. Coils	RSX-095	Channel 2-13, Wafer Ass'y.
L206	Osc. Coil	RLI-373	Channel 6
L207	Osc. Coil	RLI-417	Channel 13
L208	RF Choke	RLI-436	1.82 Microhenries
L209	Mixer Plate Coil	RLI-374	



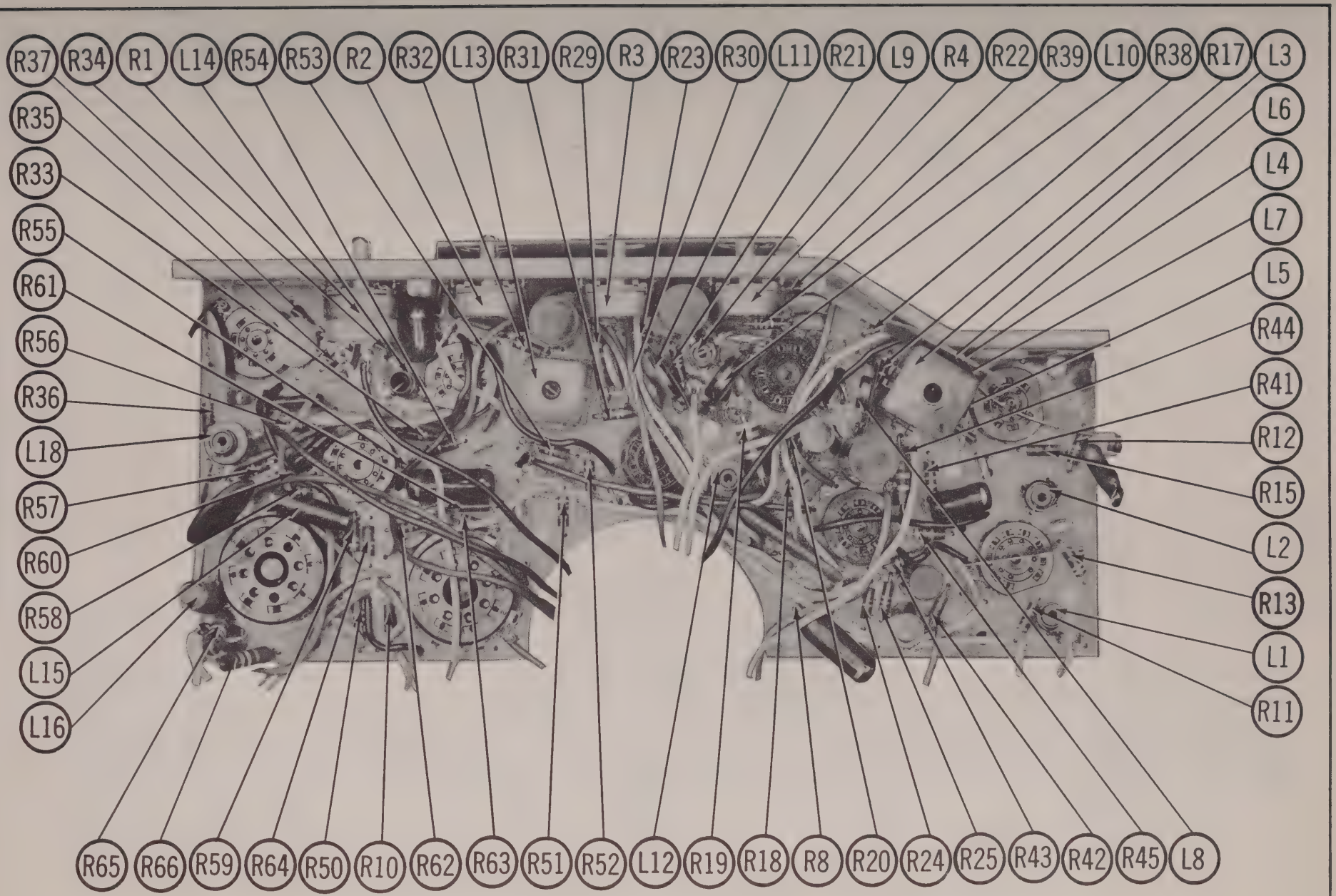
RF TUNER—TOP VIEW



RF TUNER-LEFT SIDE



RF TUNER-RIGHT SIDE



PRINTED BOARD - RESISTOR, INDUCTOR IDENTIFICATION

RESISTANCE MEASUREMENTS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	5DH8	•1.1meg	•‡2.7meg	0Ω	8Ω	9Ω	†580Ω	†580Ω	47Ω	2.3meg
V2	3CB6	.1Ω	56Ω	9Ω	10Ω	†245Ω	†245Ω	0Ω		
V3	6AU8A	0Ω	2.1meg	†23K	11.5Ω	10Ω	82Ω	1meg	†24Ω	†3800Ω
V4	3AU6	2Ω	0Ω	6Ω	5Ω	†7000Ω	†7000Ω	100Ω		
V5	3AV6	10meg	0Ω	4Ω	5Ω	150K	150K	‡1meg		
V6	12CA5	120Ω	0Ω	12.5Ω	14.5Ω	0Ω	†700Ω	†930Ω		
V7	12R5	0Ω	•750K	8Ω	6Ω	• 750K	†24Ω	†210Ω		
V8	6CG7	†15K	1.2meg	1000Ω	4Ω	2.5Ω	†150K	• 100K	1000Ω	0Ω
V9	25EC6	NC	17Ω	0Ω	NC	1.5meg	NC	22Ω	†24Ω	TOP CAP ‡14Ω
V10	12D4	NC	NC	¶190K	NC	†24Ω	NC	14.5Ω	17Ω	
V11	1X2A	PINS 1 THRU 9 HAVE INFINITE RESISTANCE								TOP CAP ‡334Ω
V12	14AJP4	12.5Ω	47K	‡85K	‡100K	NC	NC	• 270K	11.5Ω	
V201	2CY5	2.3meg	0Ω	2.5Ω	1.5Ω	†40Ω	†7000Ω	0Ω		
V202	5CL8	15K	†8200Ω	0Ω	0Ω	1.5Ω	†40Ω	†40Ω	0Ω	235K
ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9

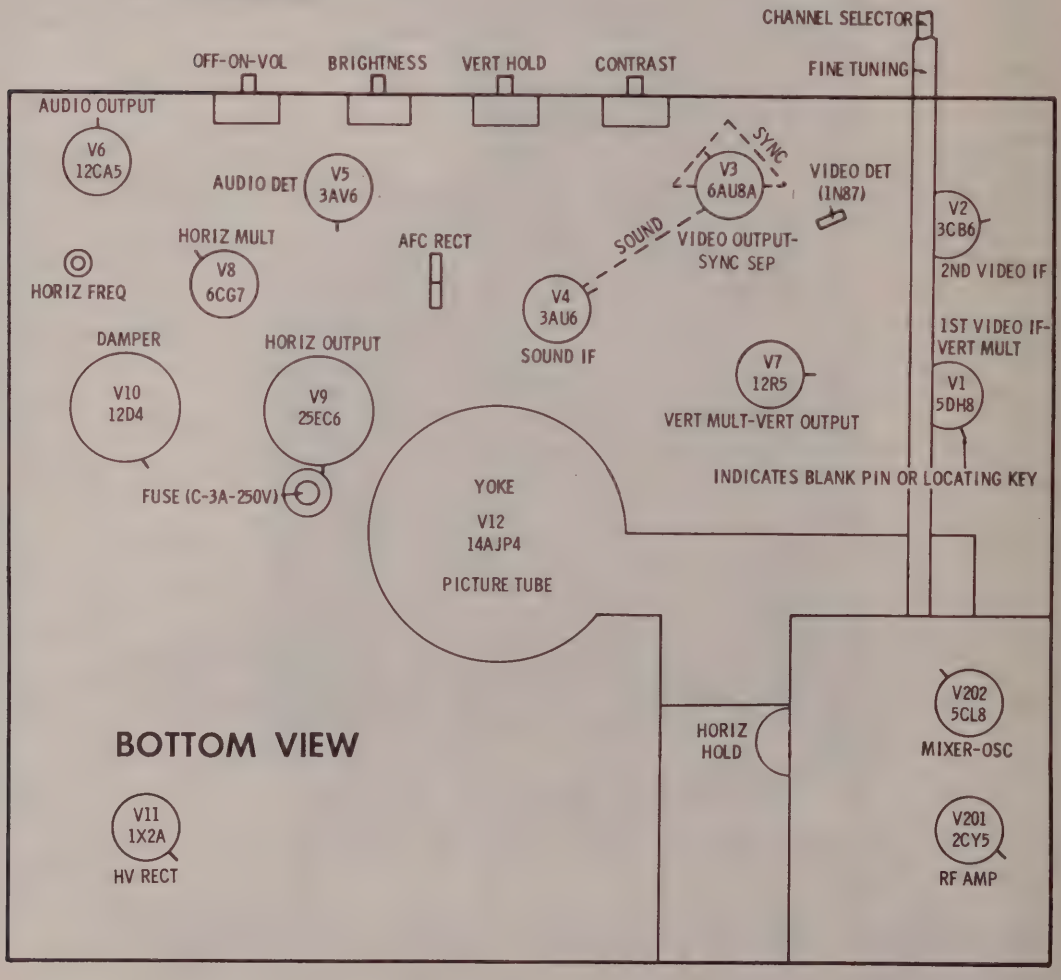
¶ THIS READING WILL VARY DEPENDING UPON THE CONDITION OF THE ELECTROLYTIC CAPACITOR CONNECTED IN THE ASSOCIATED CIRCUIT.

• THIS READING WILL VARY. CONTROL SET FOR NORMAL OPERATION.

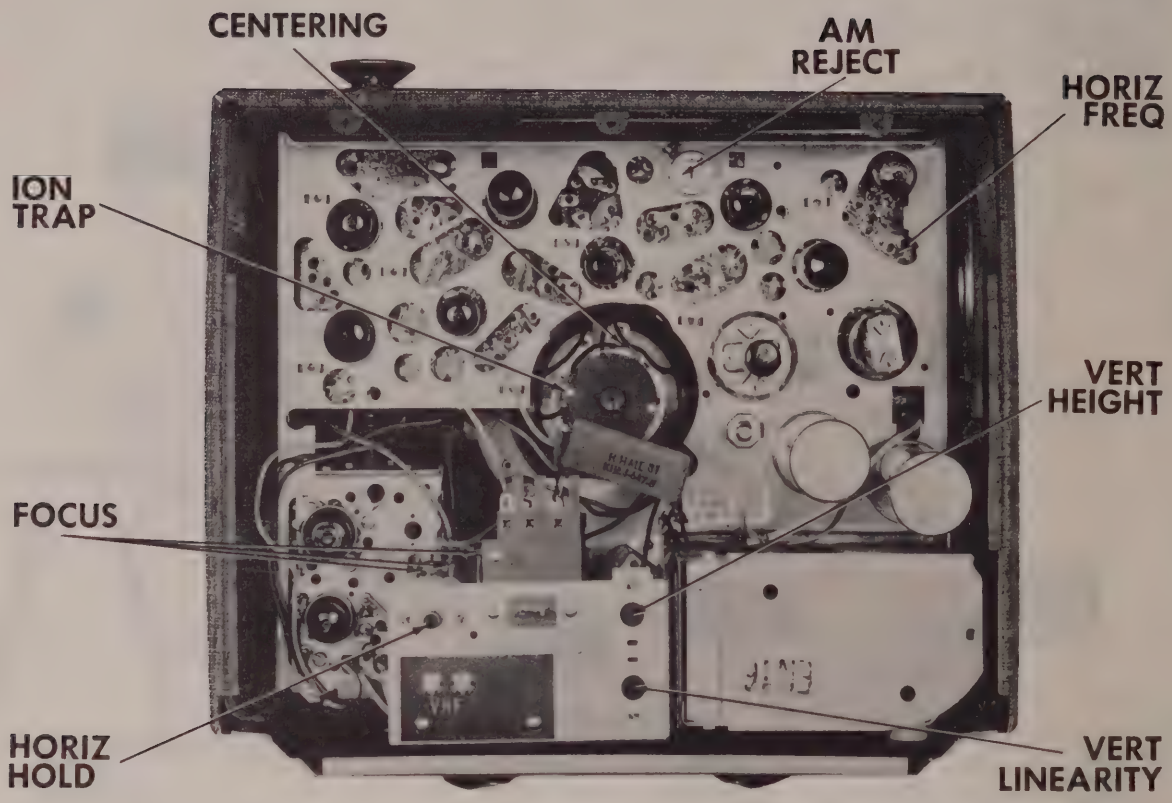
† MEASURED FROM 140V SOURCE.

‡ MEASURED FROM PIN 3 OF V10.

NC NO CONNECTION.



TUBE PLACEMENT CHART



CABINET—REAR VIEW

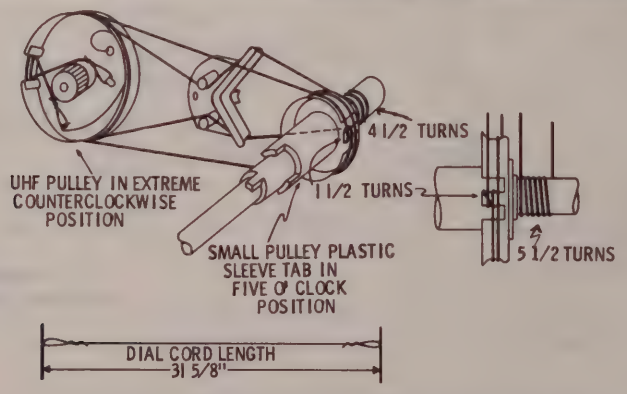
HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

Tune the receiver to a weak signal and adjust the controls for a normal picture.

Connect a short clip lead from point Ⓓ to point Ⓔ. Connect a 2200Ω resistor from point Ⓕ to point Ⓖ.

Adjust the Horizontal Hold to the point where the picture appears to float back and forth across the screen.

Remove the 2200Ω resistor and adjust the Horizontal Frequency (B1) until the picture again appears to float back and forth across the screen. Remove the clip lead from points Ⓓ and Ⓔ.


4 1/2 TURNS
UHF PULLEY IN EXTREME COUNTERCLOCKWISE POSITION
1 1/2 TURNS
5 1/2 TURNS
SMALL PULLEY PLASTIC SLEEVE TAB IN FIVE O' CLOCK POSITION
DIAL CORD LENGTH
31 5/8"

UHF DRIVE CORD STRINGING

DISASSEMBLY INSTRUCTIONS

CHASSIS REMOVAL

1. Remove 3 push-on type knobs from the side.
2. Remove 2 wood screws holding the knob escutcheon and remove the remaining knobs.
3. Remove 6 wood screws holding the rear cover. Remove the rear cover.
4. Remove 2 wing nuts holding the speaker.
5. Remove 4 chassis bolts from the bottom, holding the chassis mounting board.
6. Remove the chassis.

CAUTION NOTE

ONE SIDE OF AC LINE CONNECTED TO CHASSIS
Care should be exercised when connecting test equipment or physically contacting the chassis.

821 Series

MUNTZ MODELS
821 Series, 824 Series, 827 Series

TRADE NAME	Muntz	MODELS 821 Series, 824 Series, 827 Series
MANUFACTURER	Muntz TV Inc., 1000 Grey Avenue, Evanston, Illinois	
TYPE SET	Television Receiver	
TUBES	Eleven	
POWER SUPPLY	110-120 Volts AC, 60 Cycle	RATING 125 Watts, 1.25 Amp. @ 117 Volts AC
TUNING RANGE	Channels 2 thru 13 VHF, 14 thru 83 UHF, Video IF 45.75MC, Sound IF 41.25MC (Intercarrier)	

SERVICING IN THE FIELD

TUNER OSCILLATOR ADJUSTMENTS

Touch-up adjustment of the VHF Oscillator is possible by removing the Channel Selector and Fine Tuning knobs. Set the Fine Tuning at the center of its range. One slug for HIGH band adjustment is located at 4 o'clock, and should be adjusted first. The LOW band adjustment is located at 9 o'clock. Adjust for best picture and sound.

PICTURE TUBE SAFETY GLASS CLEANING

Remove the wood screws holding the trim strip at the top edge of the safety glass. Tilt glass out at the top and lift up to remove.

FOCUS

The focus may be varied by the position of a strap on the base of the Picture Tube. The strap can be connected between pins 6 and 2, or 6 and 10. Readjust the Beam Alignment Magnet for the best focus consistent with maximum brightness.

HORIZONTAL OSCILLATOR FIELD ADJUSTMENTS

For adjustment of the Horizontal Oscillator, it is necessary to remove the rear cover and supply power to set. Set the Horizontal Hold at the center of its range and adjust the Horizontal Frequency slug (B1) until the picture synchronizes horizontally. (For location, see tube placement chart.)

SOUND IF DETECTOR BUZZ ADJUSTMENT

To eliminate intercarrier buzz, adjust the Discriminator secondary (A10) located on top of chassis.

FUSE DEVICE

A 5Ω fusible resistor (R77) is used for low voltage power supply protection. (For location, see tube placement chart.)

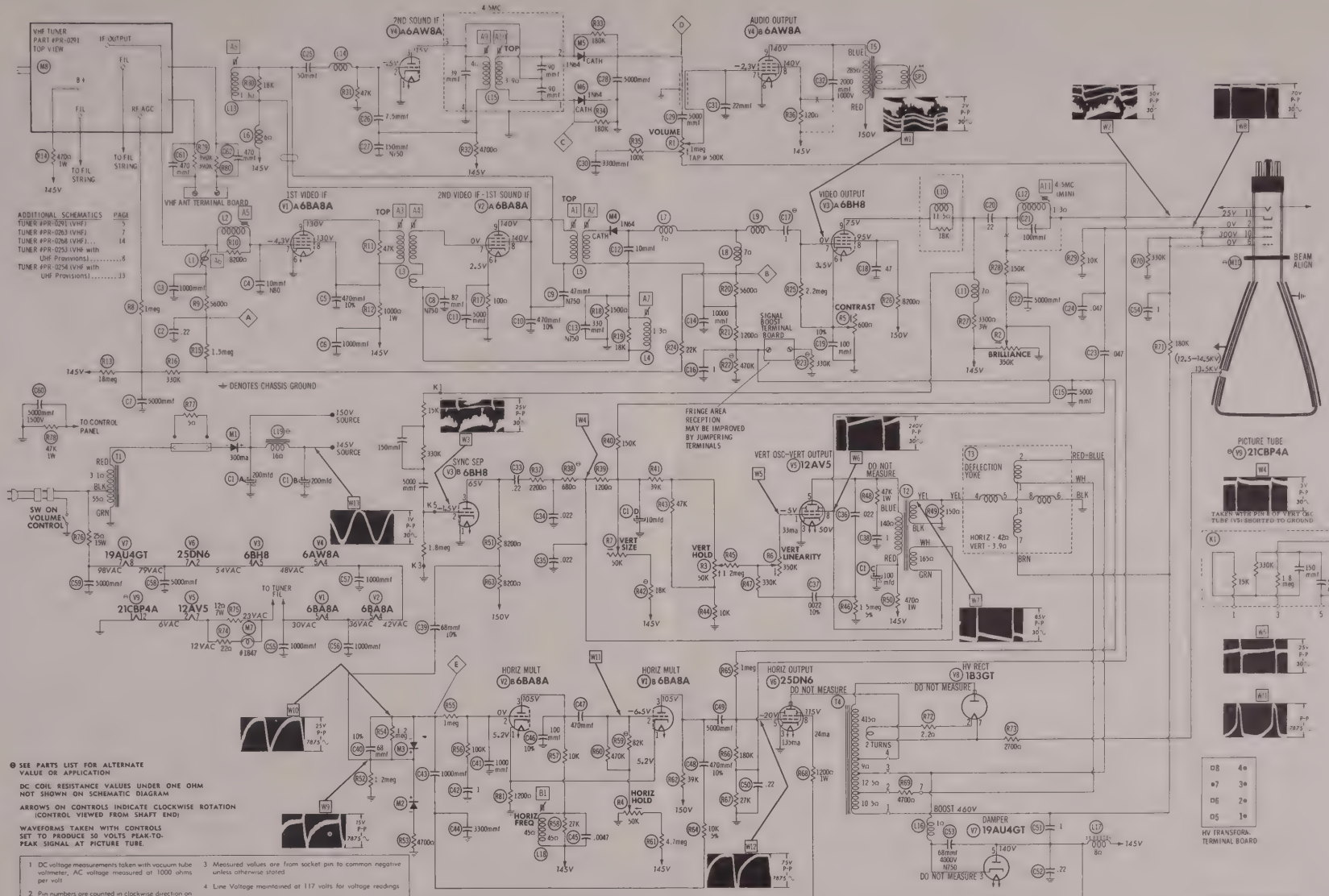
CENTERING

Centering is accomplished mechanically by adjusting two magnetic rings around the neck of the picture tube. Rotate the two rings around the neck of the tube until the picture is properly centered.

HOWARD W. SAMS & CO., INC. • Indianapolis 5, Indiana

The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed. Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. © 1958 Howard W. Sams & Co., Inc., Indianapolis 5, Indiana. Printed in U.S. of America

H567



SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM

ARROWS ON CONTROLS INDICATE CLOCKWISE ROTATION (CONTROL VIEWED FROM SHAFT END)

WAVEFORMS TAKEN WITH CONTROLS SET TO PRODUCE 50 VOLTS PEAK-TO-PEAK SIGNAL AT PICTURE TUBE.

1 DC voltage measurements taken with vacuum tube voltmeter, AC voltage measured at 1000 ohms per volt

2 Pin numbers are counted in clockwise direction on bottom of socket

3 Measured values are from socket pin to common negative unless otherwise stated

4 Line Voltage maintained at 117 volts for voltage readings

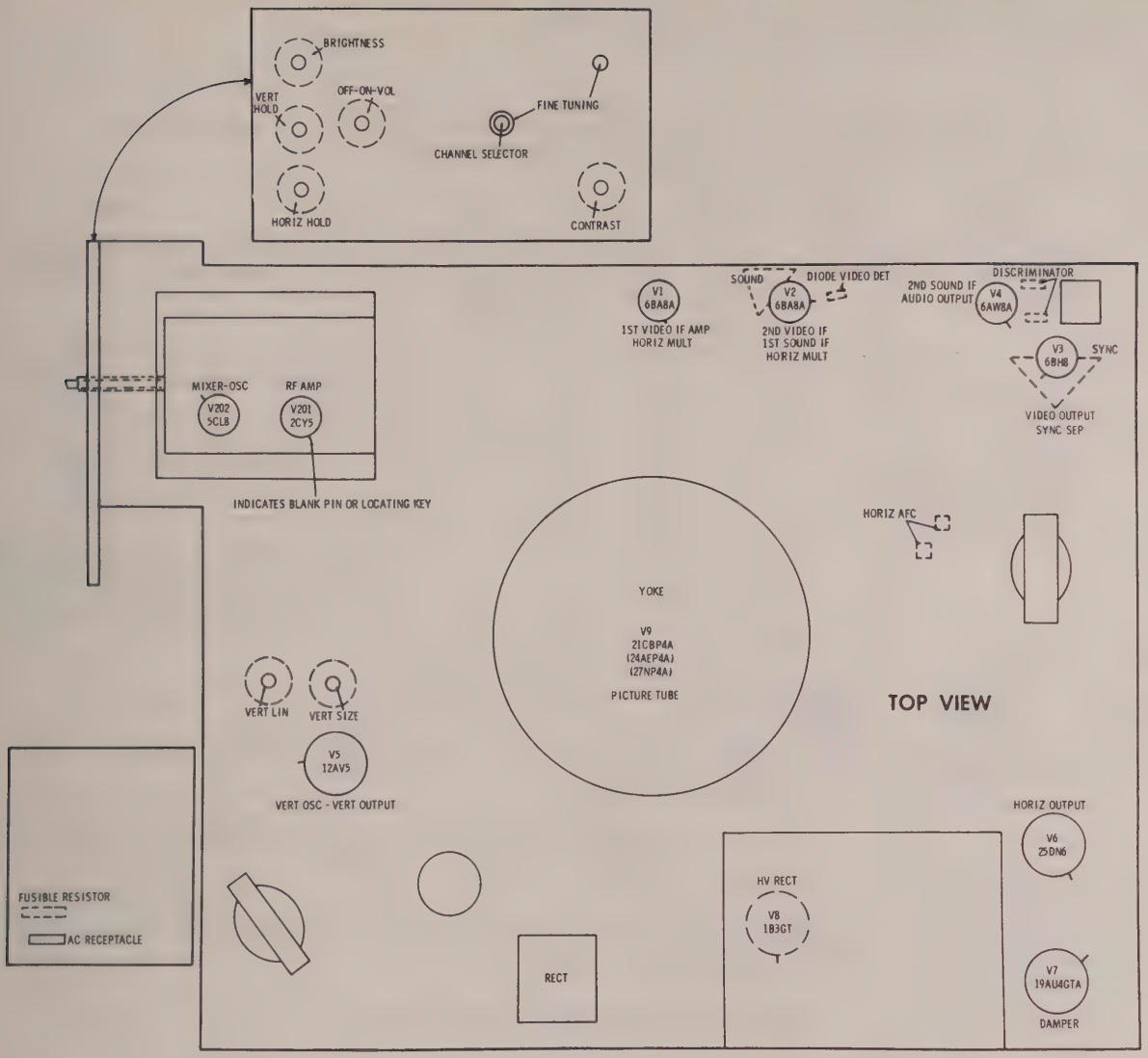
5 All controls set for normal operation; no signal applied

A PHOTOFACT STANDARD NOTATION SCHEMATIC

©Howard W. Sams & Co., Inc. 1958

MUNTZ MODELS
821 Series, 824 Series, 827 Series

TUBE PLACEMENT CHART



TUBE FAILURE CHECK CHART

The following chart lists tubes whose failures are most likely to produce indicated symptoms. Refer to tube placement chart for location and type of tube.

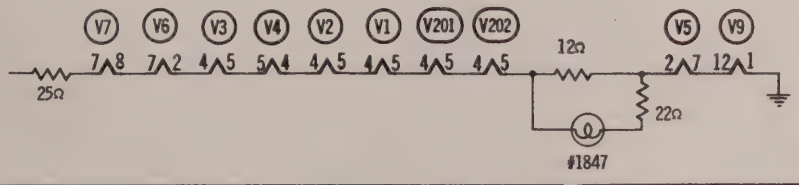
POWER SUPPLY FAILURE
No raster, no sound Fusible Resistor (R77), Rectifier (M1)

SWEEP FAILURE
No raster, has sound M2, V2, V1, V6, V7, V8, V9
No vertical deflection V5
Poor vert. linearity or foldover V5
Poor horiz. linearity or foldover V2, V1, V6, V7
Narrow picture V2, V1, V6, V7, M1
Vert. off freq. V5
Horiz. off freq. V2, V1

LOSS OF PICTURE OR SOUND
No pic, no sound, has raster V1, V2, Diode (M3)
No pic, no sound, has snow V201, V202
No pic, has sound, has raster V3, V9
Has pic, no sound V2, V4, Diode (M4, M5)

SYNC FAILURE
No vert. sync V3
No horiz. sync V3, Rectifier (M2)
No vert. or horiz. sync V3

This receiver employs tubes used in a series filament network, an open filament in any tube will cause the set to be inoperative. (See circuit below.)



ALIGNMENT INSTRUCTIONS

PRE-ALIGNMENT INSTRUCTIONS

USE AN ISOLATION TRANSFORMER TO PROTECT THE TEST EQUIPMENT.
The High Voltage lead should be securely taped and kept away from the chassis.
Allow a 20 minute warm-up period for the receiver and test equipment.

VIDEO IF ALIGNMENT

Connect the negative lead of a 5.5 volt bias supply to point (A). Positive to chassis.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.
Use only enough sweep generator output to provide a usable pattern on scope.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
1.	.001mfd	High side to pin 7 (grid) of 6BA8 (V2). Low side to chassis.	44MC 10MC Swp)	41.25MC 42.5MC 43.0MC 44.75MC 45.75MC 47.25MC	Any non-interfering channel	Vert. Amp. thru 10K to point (B). Low side to chassis. (Across Video Detector Load)	A1, A2	Adjust for response similar to Fig 1 peaking at approximately 44.25MC.
2.	"	High side to pin 7 (grid) of 6BA8 (V1). Low side to chassis.	"	"	"	"	A3, A4	Adjust for response similar to Fig. 2.
3.	Direct	High side to ungrounded tube shield floating over Mixer-Osc. tube (V202) Low side to chassis.	"	"	"	"	A5	Adjust for response similar to Fig. 2 peaking at approximately 44.5MC.
4.	"	"	"	"	"	"	A6 & Mixer Plate Coil	Adjust A6 for maximum gain of response similar to Fig. 3. Adjust Mixer Plate Coil to control steepness of low frequency side of response curve. If necessary, retouch A5 to obtain desired response.

SOUND IF ALIGNMENT

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
5.	.01mfd	High side to point (B). Low side to chassis.	4.5MC (Unmod)	Any non-interfering channel	DC probe thru 10K to point (C). Common to chassis.	A7, A8, A9	Adjust for maximum deflection.
6.	"	"	"	"	DC probe thru 10K to point (D). Common to chassis.	A10	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting.

4.5MC TRAP ALIGNMENT

Tune in a strong black and white TV signal and adjust the Fine Tuning until a 4.5MC beat pattern can be seen in the picture. Adjust A11 for MINIMUM beat interference. Adjust carefully as this is a critical adjustment.

TUNER ALIGNMENT INSTRUCTIONS LOCATED ON PAGE 6.

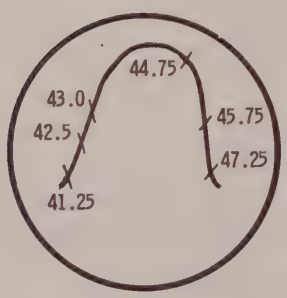


FIG.1

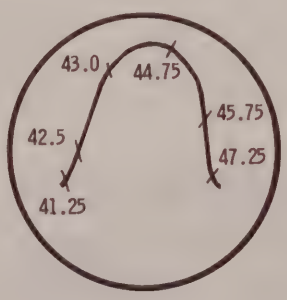


FIG. 2

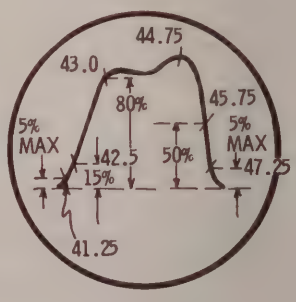
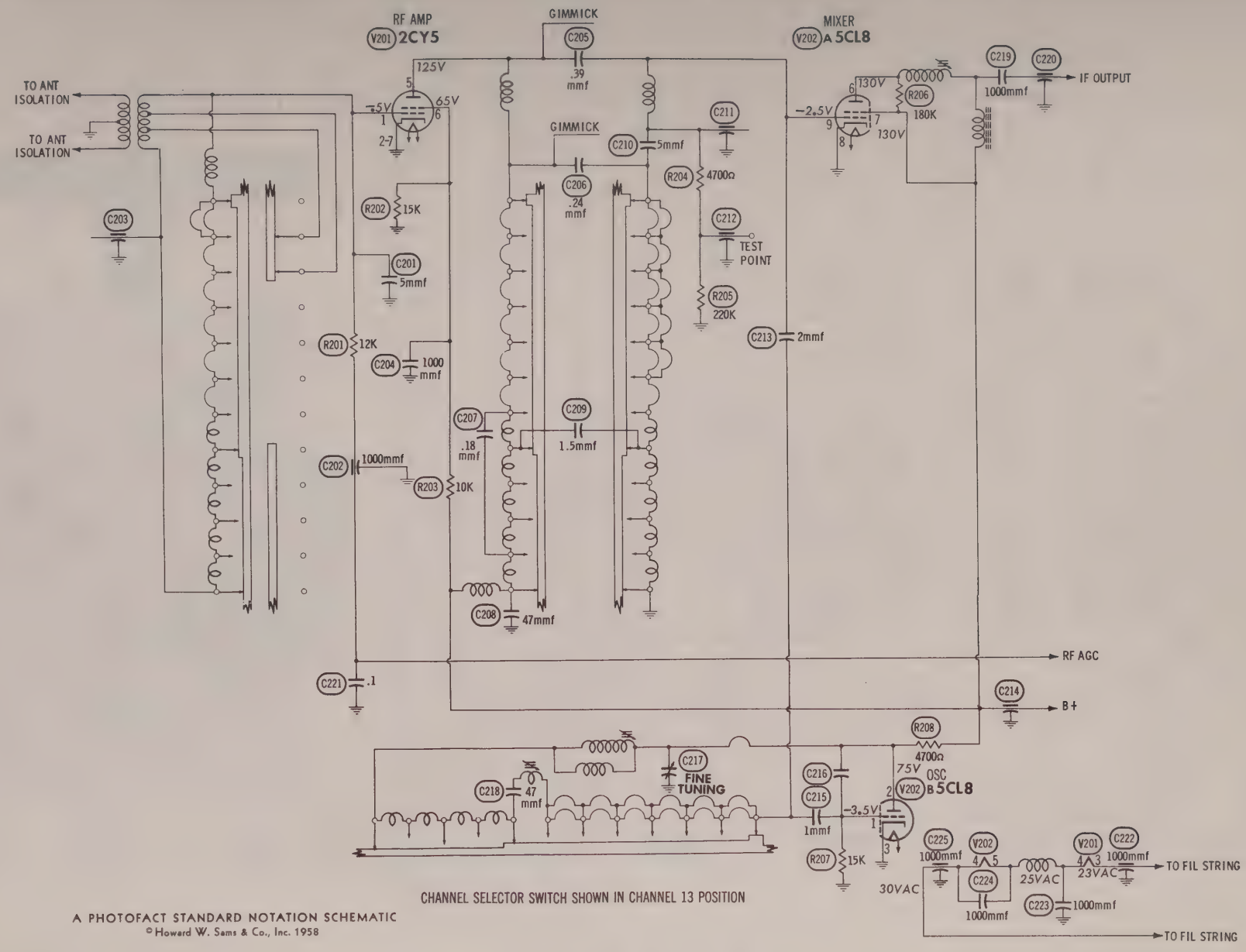


FIG.3



A PHOTOFACT STANDARD NOTATION SCHEMATIC

©Howard W. Sams & Co., Inc. 1958

VHF TUNER #PR-0291

821 Series, 824 Series, 827 Series

MUNTZ MODELS

TUNER PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V201	RF Amp.	2CY5	

ITEM No.	USE	TYPE	NOTES
V202	Mixer-Osc.	5CL8	

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA						NOTES
	CAP.	VOLT	MUNTZ PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	
C201	5			DI -000005	DD-050	L10V5	ZT-555	5GA-V5	
C202	1000			EF-001	MFT-1000			503C-D1	
C203									
C204	1000			BPD-001	DD-102	BYA6D1	DC521	5HK-D1	
C205	.39								
C206	.24								
C207	.18								
C208	47			BPD-000047	DD-470	L10Q47	UC-5447	5GA-Q47	
C209	1.5			NPO-SI 1.5	TCZ-1R5	C10V15C	ZT-5515	5TCCB-V15	
C210	5			DI-000005	DD-050	L10V5	ZT-555	5GA-V5	
C211									
C212									
C213	2								
C214									N330
C215	1								
C216									
C217									
C218	47			BPD-000047	DD-470	L10Q47	UC-5447	5GA-Q47	
C219	1000			BPD-001	DD-102	BYA6D1	DC521	5HK-D1	
C220									
C221	.1	200		P288N-1	DF-104	CUB2P1	GEM-201	2TM-P1	
C222	1000			EF-001	MFT-1000			503C-D1	
C223	1000			BPD-001	DD-102	BYA6D1	DC521	5HK-D1	
C224	1000			BPD-001	DD-102	BYA6D1	DC521	5HK-D1	
C225	1000			EF-001	MFT-1000			503C-D1	

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING		MUNTZ PART No.	NOTES
	OHMS	WATT		
R201	12K			
R202	15K			
R203	10K			
R204	4700Ω			

ITEM No.	RATING		MUNTZ PART No.	NOTES
	OHMS	WATT		
R205	220K			
R206	180K			
R207	15K			
R208	4700Ω			

TUNER ALIGNMENT INSTRUCTIONS

VHF OSCILLATOR ALIGNMENT FOR TUNERS #PR-0254, PR-0268, PR-0291

Set the Fine Tuning to the center of its range. One slug for HIGH band adjustment is located at 4 o'clock, and should be adjusted first. The LOW band adjustment is located at 9 o'clock. Adjust for best picture and sound.

VHF OSCILLATOR ALIGNMENT FOR TUNERS #PR-0253, PR-0263

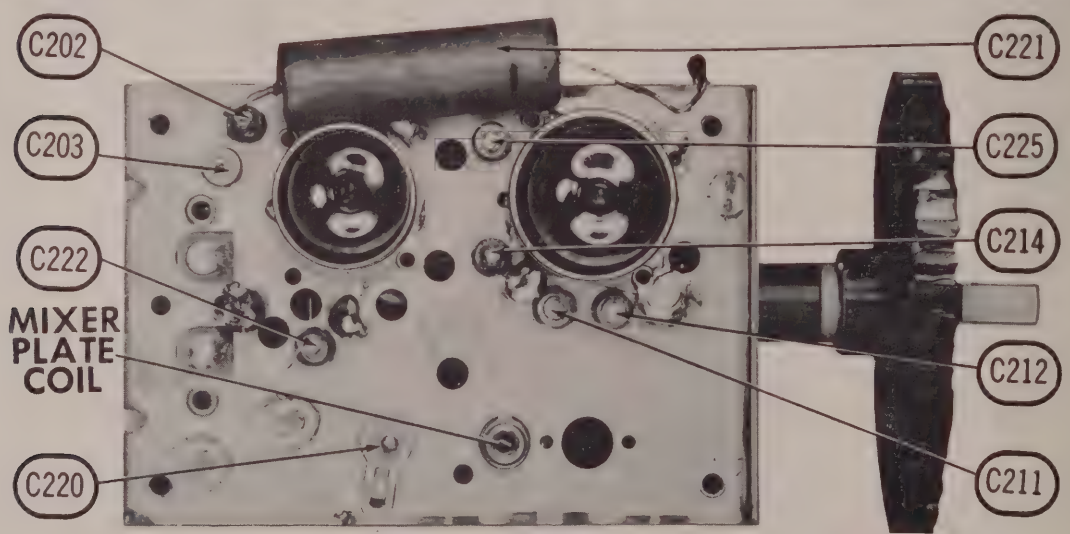
Set the Fine Tuning at he center of its range. The adjustments are accessible, one at a time, as the Channel Selector is rotated. Adjust for best picture and sound.

VHF RF AND MIXER ALIGNMENT

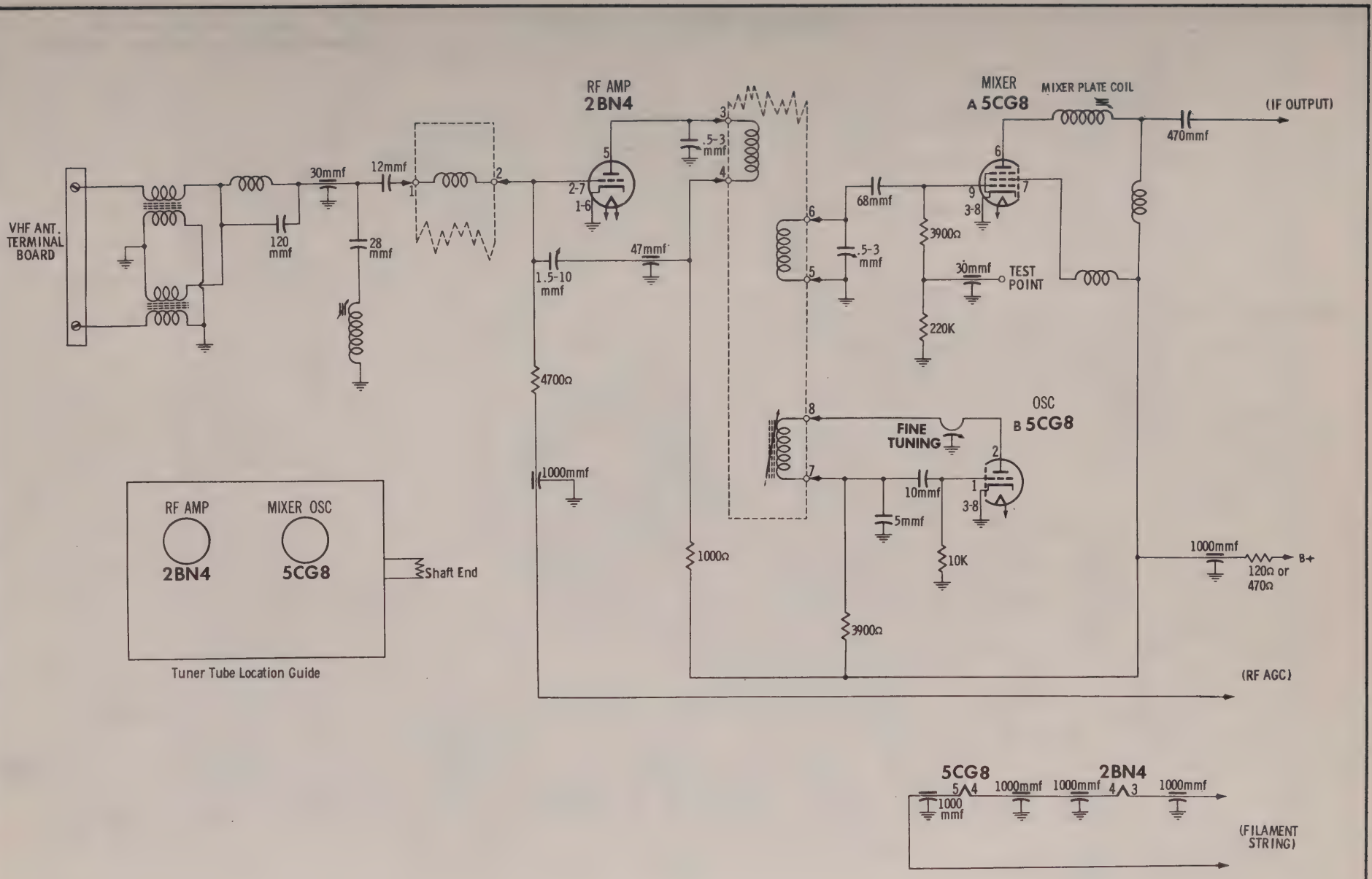
This portion of the receiver has been properly aligned at the factory and is very stable. Alignment of this portion should not be required in the field.

UHF TUNER ALIGNMENT

This portion of the receiver has been properly aligned at the factory and is very stable. Alignment of this portion should not be required in the field.



RF TUNER—TOP VIEW



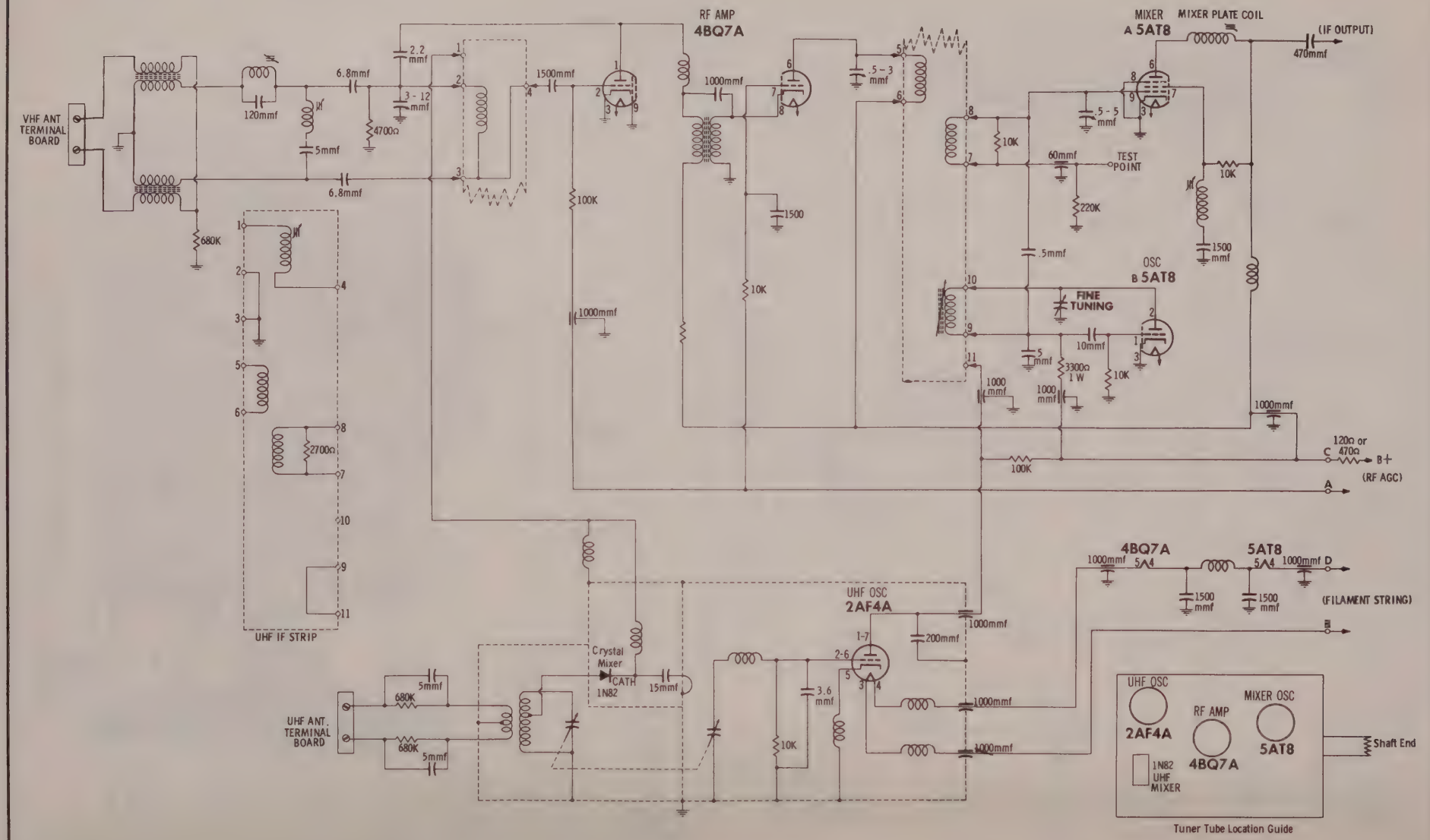
A PHOTOFACT STANDARD NOTATION SCHEMATIC

© Howard W. Sams & Co., Inc. 1958

VHF TUNER #PR-0263

821 Series, 824 Series, 827 Series

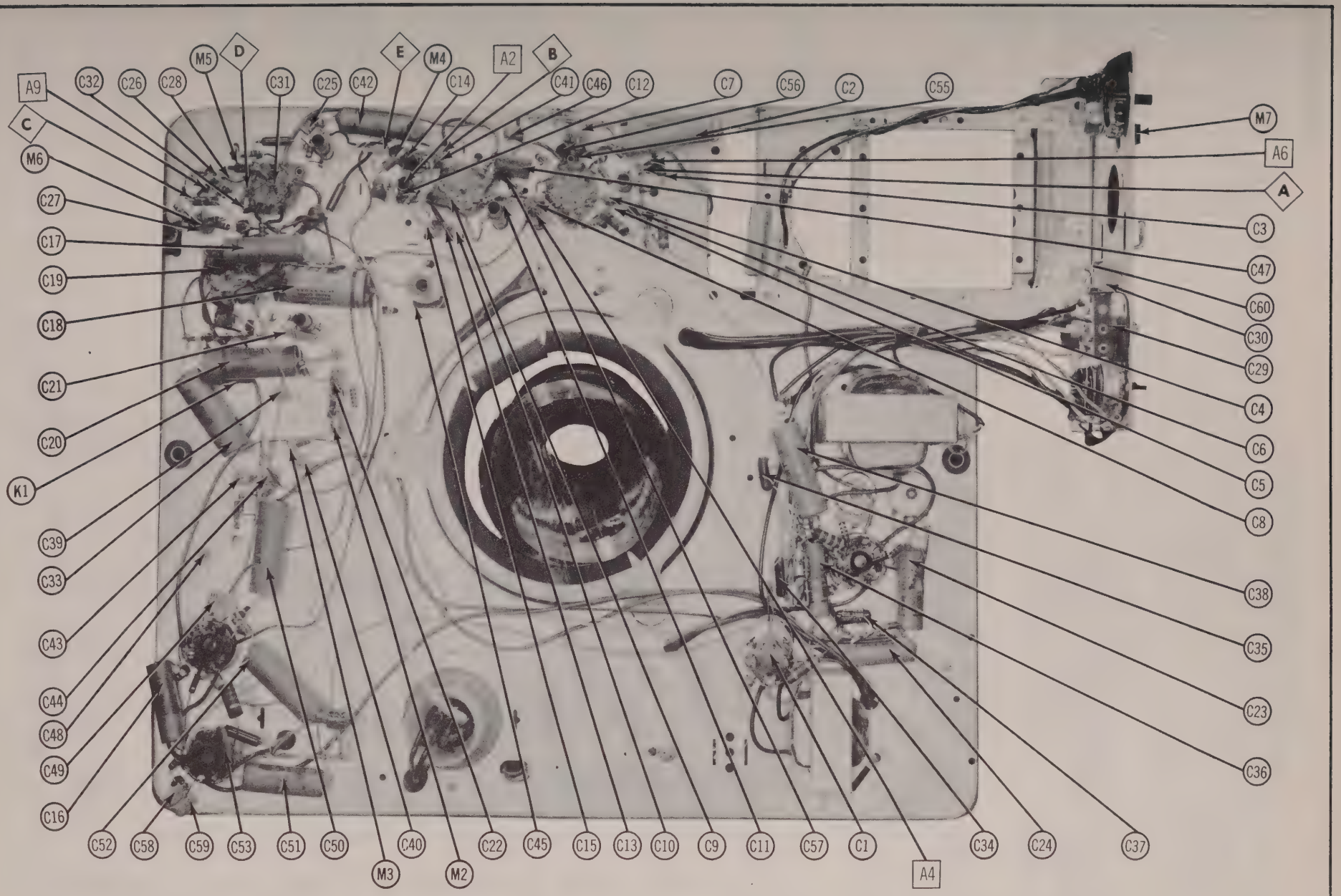
MUNTZ MODELS



A PHOTOFACT STANDARD NOTATION SCHEMATIC

© Howard W. Sams & Co., Inc. 1958

UHF-VHF TUNER #PR-0253



CHASSIS BOTTOM VIEW-CAPACITOR AND ALIGNMENT IDENTIFICATION

PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No	USE	TYPE	NOTES
V1	1st Video IF Amp. - Horiz. Mult.	6BA8A	
V2	2nd Video IF Amp. - 1st Sound IF Amp. - Horiz. Mult.	6BA8A	
V3	Video Output-Sync Sep.	6BH6	
V4	2nd Sound IF Amp. - Audio Output	6AW8A	
V5	Vert. Osc. -Vert. Output	12AV5	
V6	Horiz. Output	35DN5	
V7	Damper	19AU4GTA	
V8	HV Rectifier	1B3GT	

PICTURE TUBE

ITEM No	REPLACEMENT DATA				NOTES
	MUNTZ PART No.	GENERAL ELECTRIC PART No.	RCA PART No.	SYLVANIA PART No.	
V9	21CBP4A 24AEP4A 27NP4A		21CBP4-A① 24AEP4 ①	21CBP4/ 21CBP4A ② 24AEP4 ③ 27NP4 ②	① "Silverama" ③ ② "Silver Screen 85"

ELECTROLYTIC CAPACITORS

ITEM No	RATING		REPLACEMENT DATA						
	CAP	VOLT	MUNTZ PART No	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No	PYRAMID PART No	SANGAMO PART No	SPRAGUE PART No.
C1A	▲200	150	CE-0042	AFHS4-38-95	D0338	FP411.8		Q-008 *FMT-339	R2326 *
B	●200	150							
C	▲100	150							
D	10	75							

* Non-catalog item.

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA							NOTES
	CAP	VOLT	MUNTZ PART No	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.		
C1	.22	200	CP-0035	P288N-22		CUB2P22	GEM-3022	2TM-P22		
C2	1000		CC-0131	BPD-001	DD-102	BYA8DI	DC531	5HK-DI		
C4	10		CC-0122							N80 10%
C5	470		CC-0159		D6-471	SR5T47			M3-347	
C6	1000		CC-0131	BPD-001	DD-102	BYA8DI	DC531	5HK-DI		
C7	5000		CC-0080	BPD-008	DD-803	BYA10D5	DC535	5HK-D5		
C8	82		CC-0157							N750
C9	47		CC-0156	N750-DI 47	DTN-47	C10Q47U	NT-5447	5TCU-Q47		N750
C10	470		CC-0159		D6-471	SR5T47			M3-347	10%
C11	5000		CC-0080	BPD-008	DD-502	BYA10D5	DC535	5HK-D5		
C12	10		CC-0122	SI 10	D6-100	L7Q2	UC-541	5GA-Q2		
C13	330		CC-0140	N750-DI 330	DTN-330	C10T33U		5TCU-T33		N750
C14	10000		CC-0187	BPD-01	DD-103	BYA8DI	DC531	5HK-DI		
C15	5000		CC-0080	BPD-008	DD-502	BYA10D5	DC525	5HK-D5		
C16	.1	200	CP-0026	P288N-1	DF-104	CUB2P1	GEM-201	2TM-P1		
C17	.1	300	CP-0026	P288N-1	DF-104	CUB2P1	GEM-201	2TM-P1		①
C18	.47	200	CP-0045	P288N-47		CUB2P47	GEM-3047	2TM-P47		
C19	100			NPO-DI 100	DD-101	L10T1	MCB231	M3-31		10%
C20	.22	400		P488N-22		CUB4P22	GEM-4022	4TM-P22		
C21	100		CM-0054	1466-0001	D6-101	5W5T1	MC235	1FM-31		
C23	5000		CC-0080	BPD-005	DD-502	BYA10D6	DC525	5HK-D5		
C23	.047	600	CP-0064	P588N-047	DF-503	CUB5P47	GEM-5147	5TM-P47		
C24	.047	200	CP-0068	P288N-047	DF-503	CUB2P47	GEM-4147	2TM-P47		
C25	50		CC-0124	SI 50	D6-500	L7Q5	UC-548	5GA-Q5		
C26	7.5		CC-0153							
C27	150		CC-0158	N750-DI 150	DTN-150	C10T15U	NT-5315	5TCU-T15		N750
C28	5000		CC-0080	BPD-005	DD-502	BYA10D5	DC525	5HK-D5		
C29	5000		CC-0080	BPD-005	DD-502	BYA10D5	DC525	5HK-D5		
C30	3300		CC-0185	BPD-0033	DD-332	BYA10D33	UC-5333	5GA-D33		
C31	22		CC-0155	SI 22	D6-220	L7Q22	UC-5422	5GA-Q22		
C32	2000	1000	-	DAC-3	DDI6-202	BYA10DE	GEM-4032	5GA-D2		
C33	.22	200	CP-0055	P288N-22		CUB2P22	GEM-3022	2TM-P22		
C34	.022	300	CP-0062	P288N-022	DD-203	CUB2S22	GEM-4122	2TM-S22		
C35	.022	200	CP-0062	P288N-022	DD-203	CUB2S22	GEM-4122	2TM-S22		
C36	.022	600	CP-0063	P688N-022	DD-203	CUB6S22	GEM-6122	6TM-S22		
C37	.0022	600	CPM-0100							10%
C38	.1	600	CP-0013	P688N-1	DF-104	CUB6P1	GEM-601	6TM-P1		
C39	68		CC-0148	NPO-DI 68	DD-680	L10Q68		5TCC-Q68		10%
C40	68		CC-0148	NPO-DI 68	DD-680	L10Q68		5TCC-Q68		10%
C41	1000		CC-0131	BPD-001	DD-102	BYA8DI	DC531	5HK-DI		
C42	.1	200	CP-0026	P288N-1	DF-104	CUB2P1	GEM-201	2TM-P1		
C43	1000		CC-0131	BPD-001	DD-102	BYA8DI	DC531	5HK-DI		
C44	3300		CC-0185	BPD-0033	DD-332	BYA10D33	UC-5333	5GA-D33		
C45	.0047	600	CPM-0013	P688N-0047	D6-472	CUB6D47	GEM-6247	6TM-D47		
C46	100		CC-0163	NPO-SI 100	D6-101	L10T1	ZT-531	5TCC-T1		10%
C47	470		CM-0048	1464-00047	D6-471	SR5T47			M3-347	
C48	470		CC-0159		D6-471	SR5T47			M3-347	10%
C49	5000		CC-0080	BPD-005	DD-502	BYA10D5	DC525	5HK-D5		
C50	22	200	CC-0055	P288N-22		CUB2P22	GEM-3022	2TM-P22		
C51	.1	400	CP-0034	P488N-1	DF-104	CUB4P1	GEM-401	4TM-P1		
C52	22	400		P488N-22		CUB4P22	GEM-4022	4TM-P22		
C53	68	6000	CC-0137							N750
C54	.1	600	CP-0013	P688N-1	DF-104	CUB6P1	GEM-601	6TM-P1		
C56	1000		CC-0131	BPD-001	DD-102	BYA8DI	DC531	5HK-DI		
C56	1000		CC-0131	BPD-001	DD-102	BYA8DI	DC531	5HK-DI		
C57	1000		CC-0131	BPD-001	DD-102	BYA8DI	DC531	5HK-DI		
C58	5000		CC-0080	BPD-005	DD-502	BYA10D5	DC525	5HK-D5		
C59	5000		CC-0080	BPD-005	DD-502	BYA10D5	DC525	5HK-D5		
C60	5000		CC-0133	DAC-9	DDI6-502	BYE502L		BL-D50		
C61	470			BPD-00047	D6-471	BYA10T47	UC-5347	5GA-T47		
C62	470			BPD-00047	D6-471	BYA10T47	UC-5347	5GA-T47		

① Some versions may use .022mfd ③ 300V in this application.

CONTROLS

ITEM No	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	MUNTZ PART No	CENTRALAB PART No.	CLAROSTAT PART No	IRC PART No	MALLORY PART No	
R1A	1meg	½	VC-0060	BT-7I	A47F5-1meg	Q19-137X	UT-443	Volume, Tap ② 500K
B	Shaft			Not Req.	KS8-3	Not Req.	Not Req.	
C	Switch			KB-1 or KR-1*	SWE-12	76-1	UB-26	
R2A	350K	½	VC-0061	B-59	A47-500K-S	QJ1-132	U50	Brilliance
B	Shaft			Not Req.	KS8-3	Not Req.	Not Req.	
R3A	50K	½	VC-0062	B-3I	A47-50K-S	QJ1-123	U35	Vert. Hold
B	Shaft			Not Req.	KS8-3	Not Req.	Not Req.	
R4A	50K	½	VC-0062	B-3I	A47-50K-S	QJ1-123	U35	Horiz. Hold
B	Shaft			Not Req.	KS8-3	Not Req.	Not Req.	
R5A	600Ω	½	VC-0059	B-4	A47-750-S	QJ1-106	U3	Contrast
B	Shaft			Not Req.	KS8-3	Not Req.	Not Req.	
R6A	350K	½	VC-0061	BX-59	A47-500K-S	QJ1-132	SU-50	Vert. Lin.
B	Shaft			Not Req.	FK8-1/4	Not Req.	Not Req.	
R7A	50K	½	VC-0062	A8-3I	A47-50K-S	QJ1-123	PTA54L	Vert. Size
B	Shaft			AK-1	FK8-1/4	Not Req.	Not Req.	

* Use KR with CRL "red label" and KB with "blue label" controls.

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING		MUNTZ PART No.	NOTES
	OHMS	WATT		
R8	1meg		RC-1004-18	
R9	5600Ω		RC-5601-18	
R10	8200Ω		RC-8201-18	
R11	47K		RC-4703-18	
R12	1000Ω	1	RC-1001-11	
R13	18meg		RC-1805-18	
R14	470Ω	1	RC-4700-11	
R15	1.5meg		RC-1504-18	
R16	330K		RC-3303-18	
R17	100Ω		RC-100-18	
R18	1500Ω		RC-1501-18	
R19	18K		RC-1803-18	
R20	5600Ω		RC-5601-18	
R21	1200Ω		RC-1201-18	
R22	470K		RC-4703-18	Note 1
R23	330K		RC-3303-18	Note 2
R24	22K		RC-2203-18	
R25	2.2meg		RC-2204-18	
R26	8200Ω		RC-8201-18	
R27	3300Ω	½	RC-3301-13	
R28	150K		RC-1503-18	
R29	10K		RC-1002-18	
R30	18K		RC-1803-18	
R31	47K		RC-4703-18	
R32	4700Ω		RC-4701-18	
R33	180K		RC-1803-18	
R34	180K		RC-1803-18	
R35	100K		RC-1003-18	
R36	120Ω		RC-120-18	
R37	2200Ω		RC-2201-18	
R38	680Ω		RC-680-18	Note 5
R39	1200Ω		RC-1201-18	
R40	150K		RC-1503-18	
R41	39K		RC-3902-18	
R42	18K		RC-1802-18	Note 3
R43	47K		RC-4703-18	
R44	10K		RC-1002-18	
R45	1.2meg		RC-1204-18	

ITEM No.	RATING		MUNTZ PART No.	NOTES
	OHMS	WATT		
R46	1.5meg 5%		RC-1504-18	
R47	330K		RC-3303-18	
R48	47K	1	RC-4702-11	
R49	150Ω		RC-150-18	
R50	4700Ω	1	RC-4701-11	
R51	8200Ω		RC-8201-18	
R52	1.2meg		RC-1204-18	
R53	4700Ω		RC-4701-18	
R54	1.2meg		RC-1204-18	
R55	1meg		RC-1004-18	
R56	100K		RC-1003-18	
R57	10K		RC-1002-18	
R58	27K		RC-2702-18	
R59	82K		RC-8202-18	Note 4
R60	470K		RC-4703-18	
R61	4.7meg		RC-4704-18	
R62	39K		RC-3902-18	
R63	8200Ω		RC-8201-18	
R64	10K 5%		RC-1002-18	
R65	1meg		RC-1004-18	
R66	180K		RC-1803-18	
R67	27K		RC-2703-18	
R68	1200Ω	1	RC-1201-11	
R69	4700Ω		RC-4701-18	
R70	330K		RC-3303-18	
R71	180K		RC-1803-18	
R72	2.2Ω		RW-002-18	
R73	2700Ω		RC-2701-18	
R74	22Ω		RC-022-18	
R75	12Ω	7	RW-012-17	
R76	25Ω	15	RW-0045	
R77	5Ω		RW-005-13	
R78	47K	1	RC-4702-11	
R79	390K		RC-3903-18	
R80	390K		RC-3903-18	
R81	1200Ω			

Note 1. Some versions use 680K in this application (Part #RC-6803-18).
Note 2. Some versions use 470K in this application (Part #RC-4703-18).
Note 3. Some versions use 10K in this application (Part #RC-1003-18).
Note 4. Some versions use 68K in this application (Part #RC-6802-18).
Note 5. Some versions use 2200Ω in this application.

TRANSFORMER (POWER)

ITEM No	RATING			REPLACEMENT DATA					NOTES
	PRI	SEC 1	SEC 2	MUNTZ PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T1	125V tap ② 117V ③ .7A			TP-0031							

TRANSFORMERS (SWEEP CIRCUITS)

ITEM No.	USE	REPLACEMENT DATA							NOTES
		MUNTZ PART No	Halldorson PART No.	Merit PART No	Ram PART No	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T2	Vert. Output	TO-0051		A-3951			26B10		
T3A	Yoke-Horiz (24MH)	LC-0085-1	DF-809	MDF-96				Y-48 ③	
B	(900)-Vert. (4.3MH)		①②	①					
M9	Rear Cover & Centering Device	PR-0234							
T4	Horiz. Output	TO-0050	FB419 ② *	HVO-75 *	X094 ③ *	A-8291 *	FLY-152 *	D-132 *	

① Use original rear cover and centering device.
② Connect yoke terminal #3 to terminal #3 of T4, yoke terminals #2 and #7 to resistor (R69), yoke terminal #1 to terminal #1 of T4.
③ Connect yoke terminal #3 to terminal #3 of T4, yoke terminal #2 to terminal #7 of T4, yoke terminal #1 to terminal #1 of T4.
④ Drill new mounting hole(s).

*HORIZONTAL OUTPUT TRANSFORMER CONNECTION DATA

Use Original Width Coil Unless Replacement Type Is Listed

ORIGINAL TERMINAL CONNECTIONS	Halldorson Replacement Connections	Merit Replacement Connections	Ram Replacement Connections	Stancor Replacement Connections	Thordarson Replacement Connections	Triad Replacement Connections
4	9	4	9	7	7	4
3	7	3	7	4	4	3
2	NC See Note ⑤	2	NC See Note ⑦	T	T	2
1	1	1	1	1	1	1

⑦ Install new damping network consisting approximately 100mmf ④ 3KV and 1000Ω 1 watt connected in series across horizontal yoke terminals #2 and #1.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA						NOTES
	PRI	SEC	MUNTZ PART No	Halldorson PART No.	Merit PART No.	Ram PART No	Stancor PART No	Thordarson PART No.	Triad PART No.	
T5	6000Ω	3-4Ω	TO-0049-1	Z1007	A-3019	AU-804	[redacted]	26B49	S-5Z	

SPEAKER

ITEM No.	TYPE			REPLACEMENT DATA		NOTES
	SIZE	FIELD	V. C. IMP.	MUNTZ PART No.	QUAM PART No.	
SP1	5"	PM	3-4Ω	SK-0025-1	52A1	
	6"	PM	3-4Ω	SK-0026	6A1	
	4"	PM	3-4Ω	SK-0022-3		
	8"	PM	3-4Ω	SK-0022-2		

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA					NOTES
		MUNTZ PART No.	Meissner PART No.	Merit PART No.	Miller PART No.	Ram PART No	
L1	1st. IF Coupling Coil	LC-0096				VF-4	
L2	1st. Video IF	LC-0087	17-4534	TV-131			
L3	2nd. Video IF	LC-0089					
L4	1st. Sound IF	LC-0096	20-1004 ▲	TV-151 ▲	1469 *▲	SF-3 ▲	
L5	3rd. Video IF	LC-0090					
L6	Shunt Peaking Coil	LC-0087-11	19-3100	TV-194	6112	VP-3	100 Microhenries
L7	Series Peaking Coil	LC-0101-1	19-3125	TV-196	6153	VP-4	120 Microhenries
L8	Shunt Peaking Coil	LC-0101-1	19-3125	TV-196	6153	VP-4	120 Microhenries
L9	RF Choke	LC-0091		SW-631			4.7 Microhenries
L10	Series Peaking Coil	LC-0101-3	19-3250 *	TV-198 *	6130 *	VP-8 *	270 Microhenries, wound on a 15K resistor
L11	Shunt Peaking Coil	LC-0101-1	19-3125	TV-196	6153	VP-4	120 Microhenries
L12	4.5MC Trap	LC-0095-1	30-1004	TV-151	1469 *	SF-3	
L13	2nd. Sound IF	LC-0095-1	30-1004	TV-151	1469 *	SF-3	
L14	RF Choke	LC-0091		SW-631			4.7 Microhenries
L15	Discriminator	LC-0078					Includes Asa'y.
L16	Resonant Choke	LC-0096		BC-566			10 Microhenries, 58MC
L17	RF Choke	LC-0097					3 Millihenries

▲ Disregard tap. ▲ Replace coil only. * Parallel with a 15K resistor.

TRANSFORMER (HORIZ. OSC.)

ITEM No.	DC RES.		REPLACEMENT DATA						NOTES
	PRI.	SEC.	MUNTZ PART No.	Meissner PART No.	Merit PART No.	Miller PART No.	Ram PART No.	Thordarson PART No.	
L18	45Ω		LO-0077	19-1576 *	TV-163 *	6210 *	H-102 *	28-5 *	* Enlarge mtg. hole.

FILTER CHOKE

ITEM No.	RATINGS			REPLACEMENT DATA						
	CURRENT (Measured)	DC RES.	INDUCTANCE (@ CURRENT 1000 ^\)	MUNTZ PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No	Thordarson PART No	Triad PART No
L19	.270A	18Ω	.7 Hy.	LC-0100-1 ①	C5041 ②			C3328 ③	26C92 ②	C-40X

① Alternate Part #LC-0081.
② Drill new mounting hole.

COMPONENT COMBINATIONS

ITEM No	USE	DESCRIPTION	MUNTZ PART No.	REPLACEMENT DATA
K1	Sync Coupling	5000mmf, 150mmf, 15K, 330K, 1.8meg	PAK-0100	

RECTIFIERS

ITEM No.	RATING	REPLACEMENT DATA						NOTES
	CURRENT (Measured)	MUNTZ PART No.	FEDERAL PART No.	GENERAL ELECTRIC PART No.	INTERNATIONAL PART No.	SARKES TARZIAN PART No.		
M1	.300A	CX-0035 ①	1023A ①	1N1008 ③	RS390BL ①	350 ① M500 ②		① Selenium Type. ② Silicon Type. ③ Germanium Type.
M2		SR-0004 ①	1215 ①		1T1 ①			
M3		SR-0004 ①	1215 ①		1T1 ①			

CRYSTAL DIODES

ITEM No.	ORIG. TYPE	REPLACEMENT DATA			NOTES
		MUNTZ PART No.	CBS PART No.	SYLVANIA PART No.	
M4	1N64	CX-0036	1N64	1N60	Video Detector (Pigtail)
M5	1N64	CX-0038	1N64	1N60	Discriminator (Pigtail)
M6	1N64	CX-0038	1N64	1N60	Discriminator (Pigtail)

MISCELLANEOUS

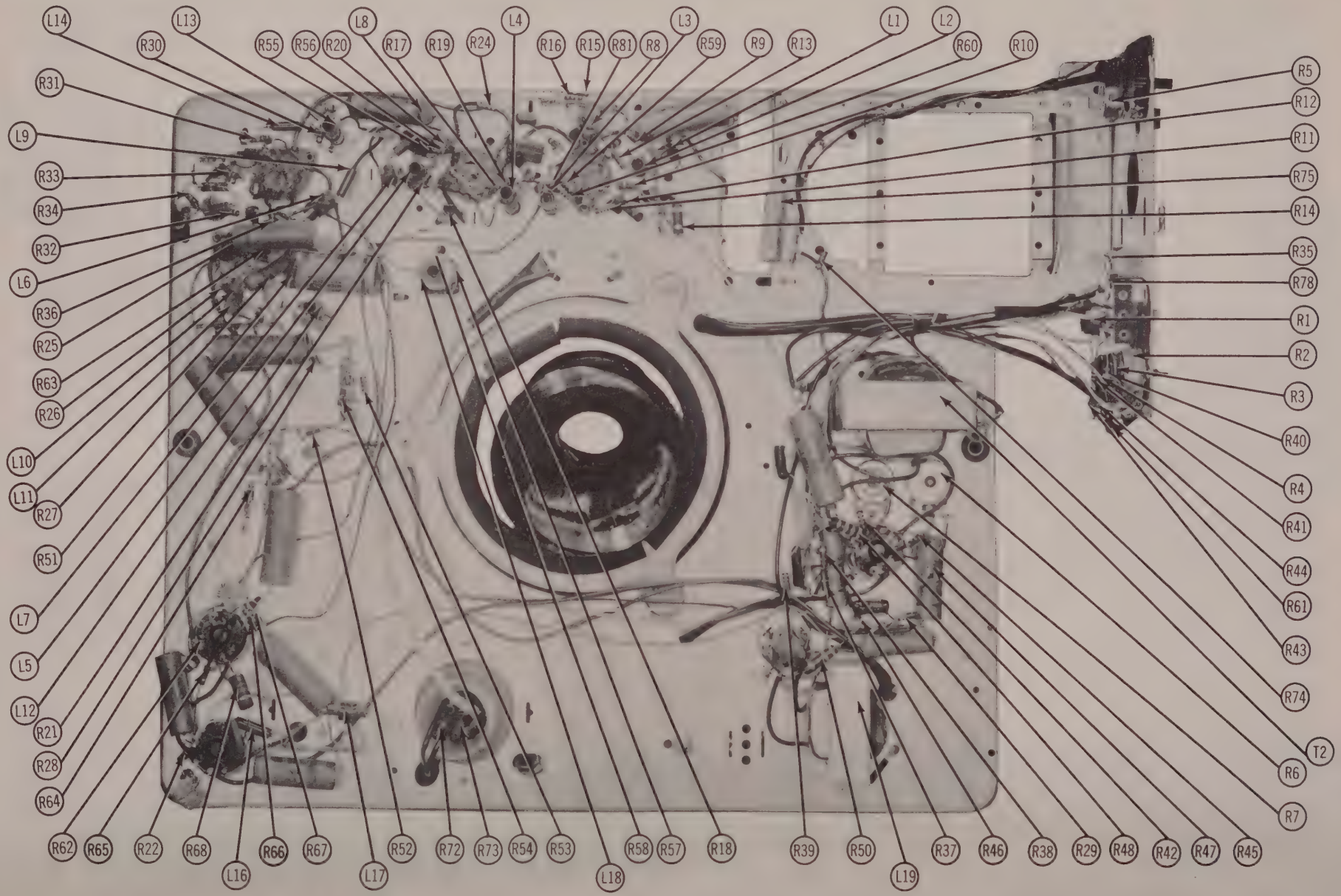
ITEM No.	PART NAME	MUNTZ PART No.	NOTES
M7	Lamp	LS-0004-3	Type #1847
M8	Tuner	PR-0291	VHF
	Tuner	PR-0260	VHF
	Tuner	PR-0263	VHF
	Tuner	PR-0254	UHF-VHF
	Tuner	PR-0253	UHF-VHF
M9	Centering Device	PR-0234	Includes Yoke Rear Cover
M10	Magnet	PR-0287	Beam Alignment Model 821 Series
	Magnet	PR-0229	Beam Alignment Model 827 Series
	Magnet	PR-8284	Beam Alignment Model 824 Series

WIRING DATA

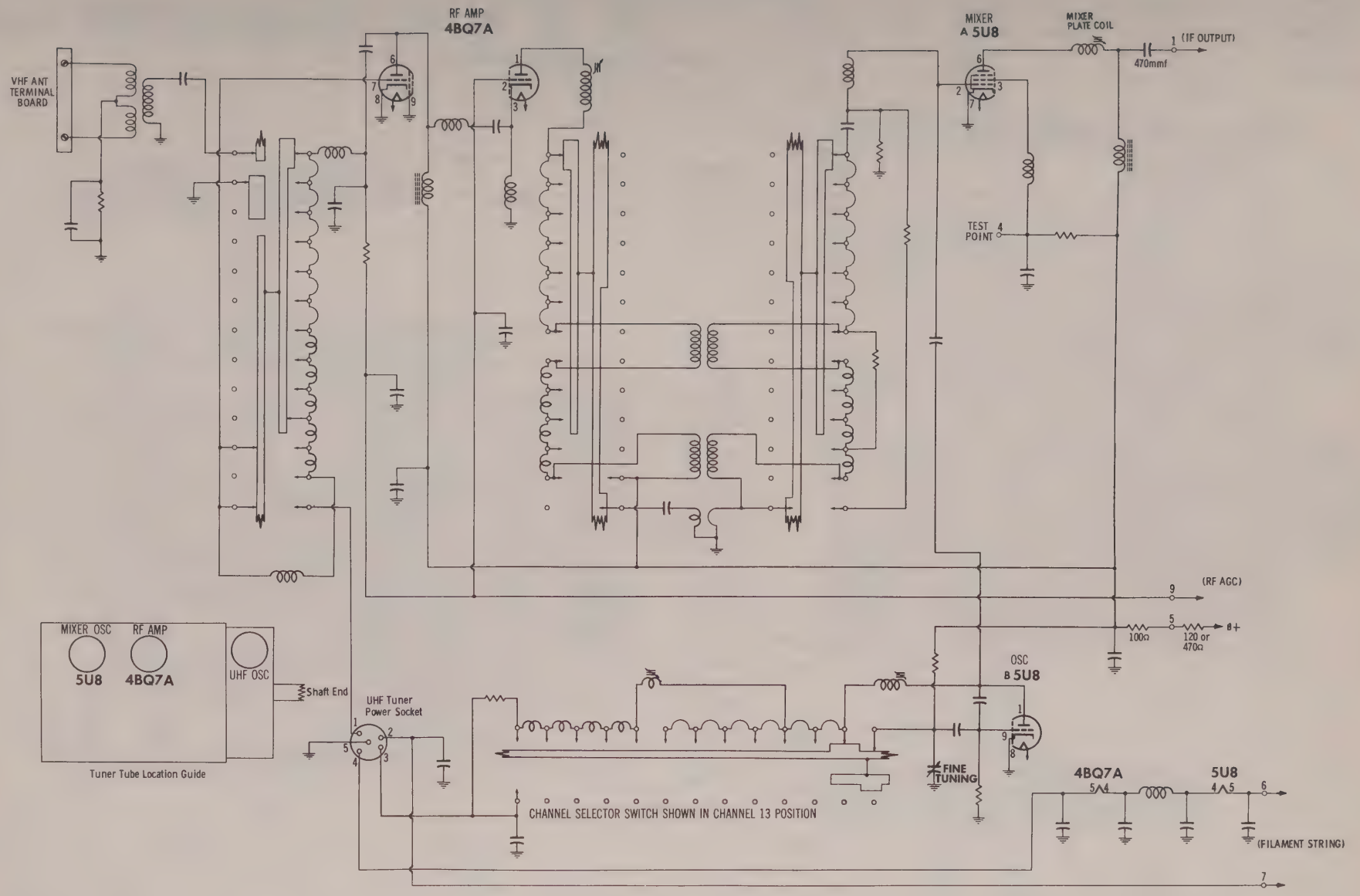
High Voltage Lead	Use BELDEN No. [redacted]
Shielded Hook-up Wire	Use BELDEN No. 8885 (Single Conductor) 8738 (Two Conductor)
General-use Unshielded Hook-up Wire	Use BELDEN No. 8530 (Solid) Available in Ten Colors 8524 (Stranded) Available in Ten Colors
Power Cord (Interlock Type)	Use BELDEN No. 8874
300Ω Tuner Input Lead	Use BELDEN No. 8225
300Ω Antenna Lead-in	Use BELDEN No. 8230 or 8275
Antenna Rotor Cable	Use BELDEN No. 8484 (Flat) or 8484 (Round) - 4 Conductor 8485 (Round) - 5 Conductor 8488 (Round) - 8 Conductor

MUNTZ MODELS 821 Series, 824 Series, 827 Series

FOLDER 2



CHASSIS BOTTOM VIEW-RESISTOR AND INDUCTOR IDENTIFICATION



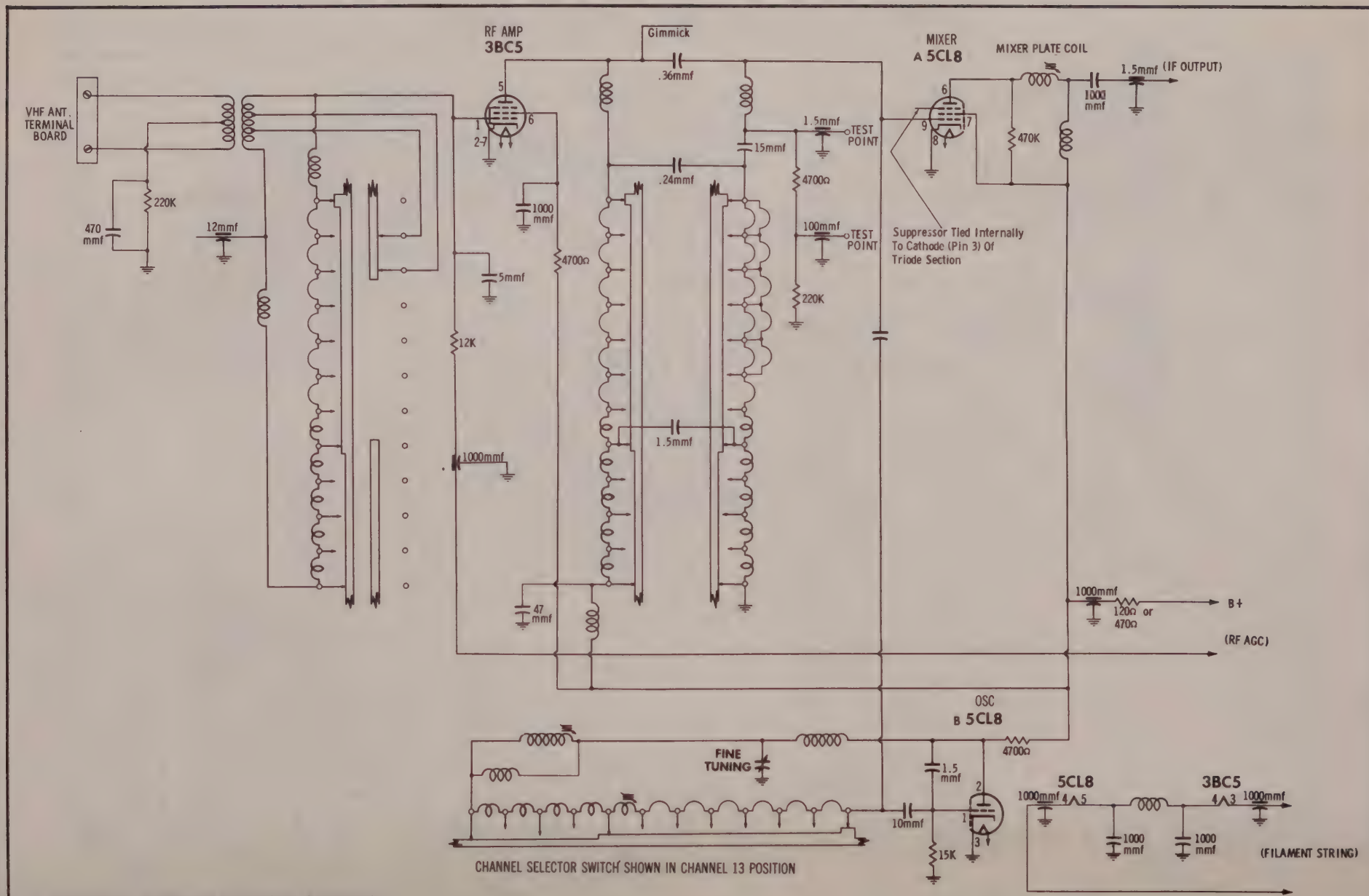
A PHOTOFACT STANDARD NOTATION SCHEMATIC

© Howard W. Sams & Co., Inc. 1958

TUNER #PR-0254 (VHF with UHF provisions)

821 Series, 824 Series, 827 Series

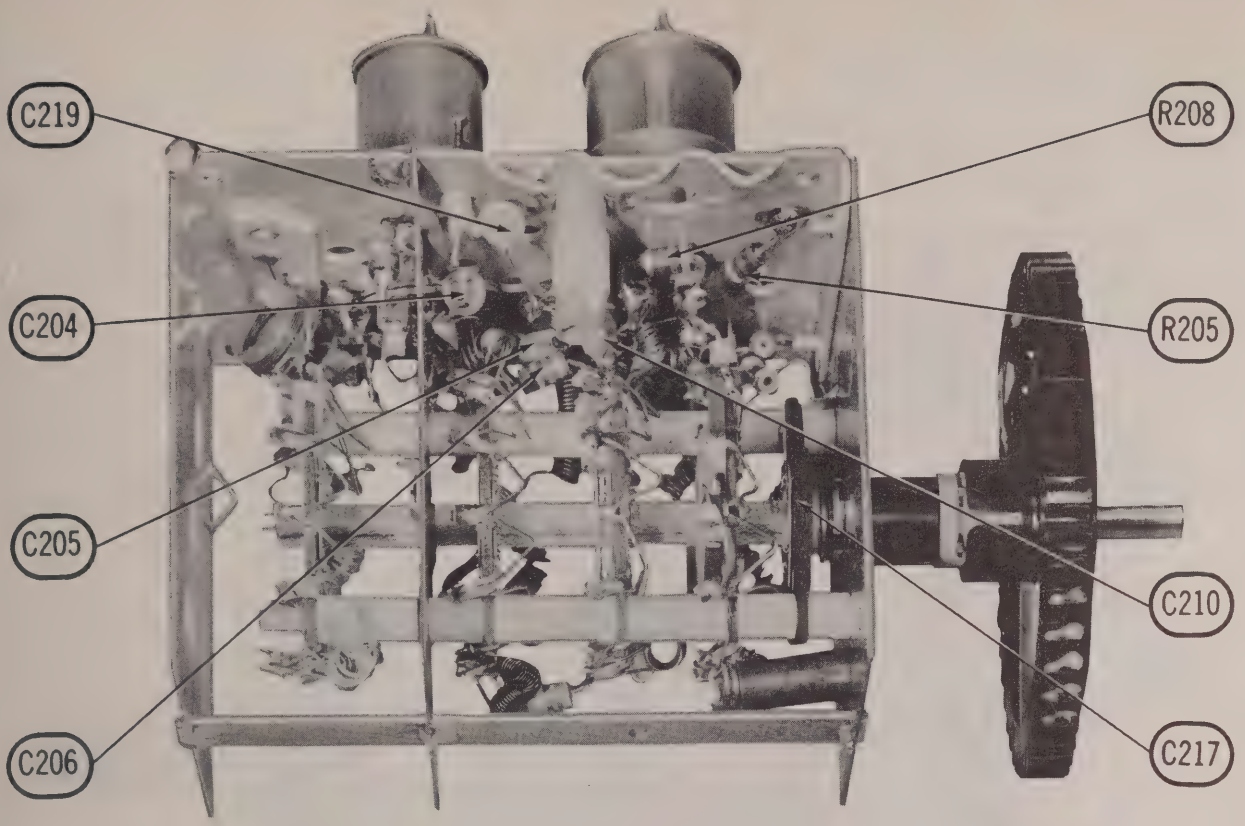
MUNTZ MODELS



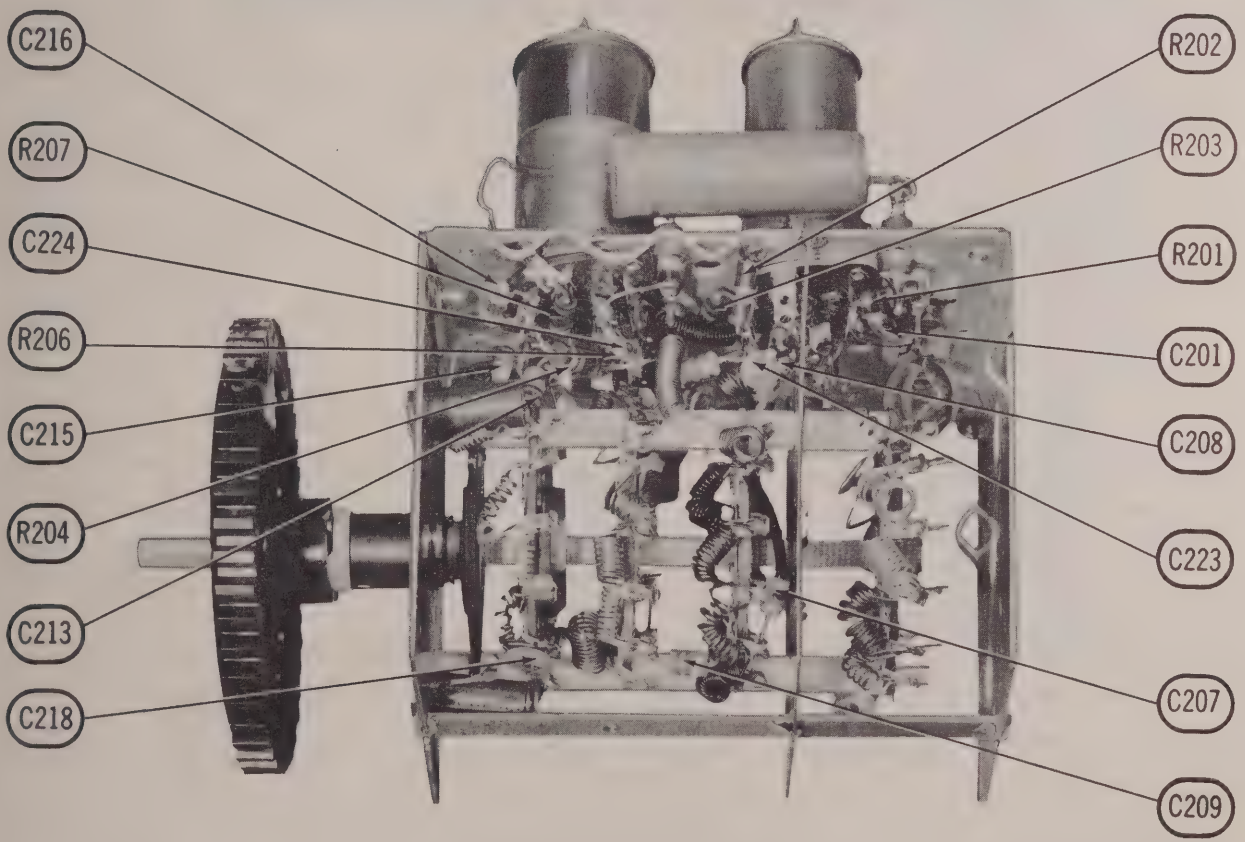
A PHOTOFACT STANDARD NOTATION SCHEMATIC

© Howard W. Sams & Co., Inc. 1958

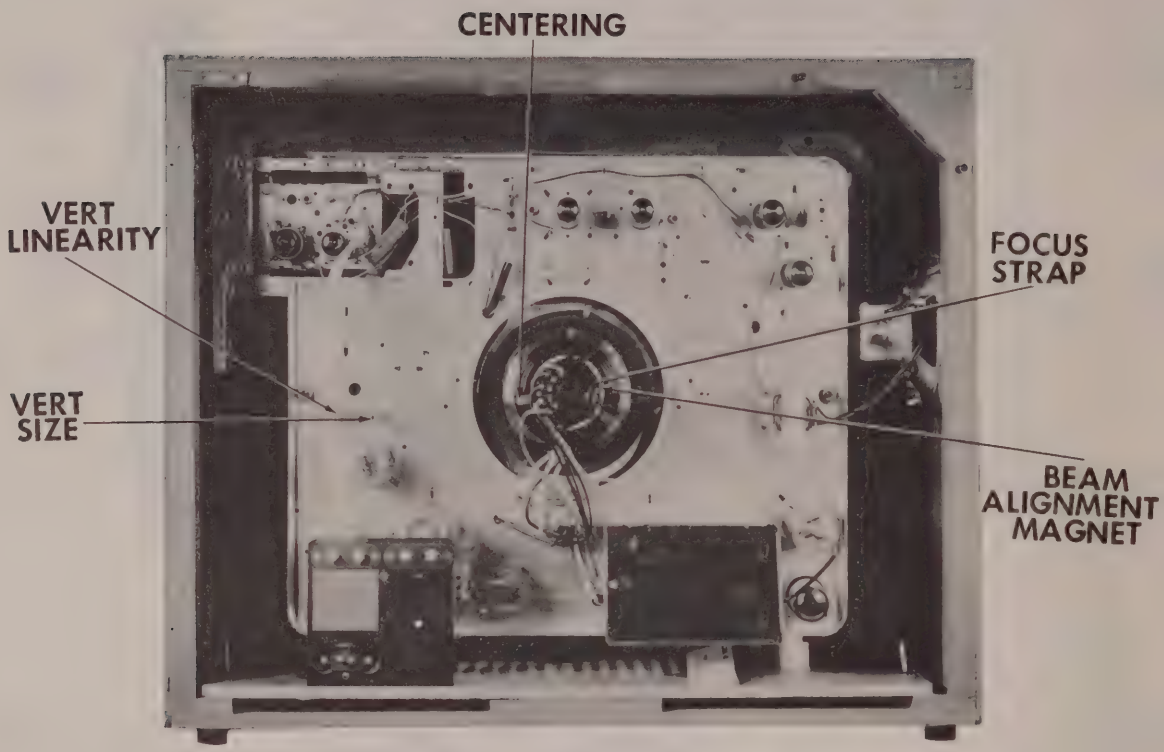
VHF TUNER #PR-0268



RF TUNER-LEFT SIDE



RF TUNER-RIGHT SIDE



CABINET—REAR VIEW

HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

Turn the set on and tune in a TV station, preferably with a test pattern. Allow the receiver a few minutes warm-up time.

Adjust controls for a normal picture.

Connect a clip lead across the Horizontal Frequency Coil (L18).

Connect a clip lead from point Ⓔ to chassis.

Adjust the Horizontal Hold (R4) until a single picture is attained.

Remove the short from L18. Adjust the Horizontal Frequency slug (B1) with the slug entering the coil from the chassis side, until a single picture is obtained. Turn B1 1/4 turn counterclockwise from this position for final setting of the slug.

Remove the clip lead from point Ⓔ and the picture should snap into sync.

Turn the Horizontal Hold fully clockwise, then turn slowly counter-clockwise until the picture falls into sync. With this setting of the Horizontal Hold, the picture should remain in sync regardless of the signal level.

Measure the DC voltage between point Ⓔ and chassis. It should measure 1 to 2 volts positive if the circuit is operating properly.

CHASSIS TOP VIEW

RESISTANCE MEASUREMENTS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	6BA8A	1200Ω	•70K	†39K	13Ω	11.5Ω	0Ω	1.7meg	†1000Ω	†1000Ω
V2	6BA8A	1200Ω	1.9meg	†10K	14.5Ω	13Ω	100Ω	1500Ω	†22Ω	†23Ω
V3	6BH8	0Ω	1.8meg	†16K	17.5Ω	16Ω	• 120Ω	2.2meg	†8200Ω	†3300Ω
V4	6AW8A	0Ω	47K	†4700Ω	14.5Ω	16Ω	0Ω	27K	†136Ω	†285Ω
V5	12AV5	• 1.3meg	1.5Ω	0Ω	TP	†626Ω	TP	3.5Ω	• †23K	
V6	25DN6	TP	17.5Ω	0Ω	TP	170K	TP	20Ω	†1200Ω	TOP CAP †10Ω
V7	19AU4GTA	TP	NC	¶450K	NC	†24Ω	TP	20Ω	23Ω	
V8	1B3GT		PINS	1 THRU 8	HAVE	INFINITE	RESISTANCE			TOP CAP †425Ω
V9	21CBP4A	0Ω	10K	PIN 10 †170K	PIN 11 • 180K	PIN 12 1.5Ω				
V201	2CY5	1.6meg	0Ω	10Ω	10.5Ω	†486Ω	†8000Ω	0Ω		
V202	5CL8	15K	†5100Ω	0Ω	11.5Ω	10.5Ω	†486Ω	†486Ω	0Ω	220K
ITEM	TYPE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9

¶ THIS READING WILL VARY DEPENDING UPON THE CONDITION OF THE ELECTROLYTIC CAPACITOR CONNECTED IN THE ASSOCIATED CIRCUIT.

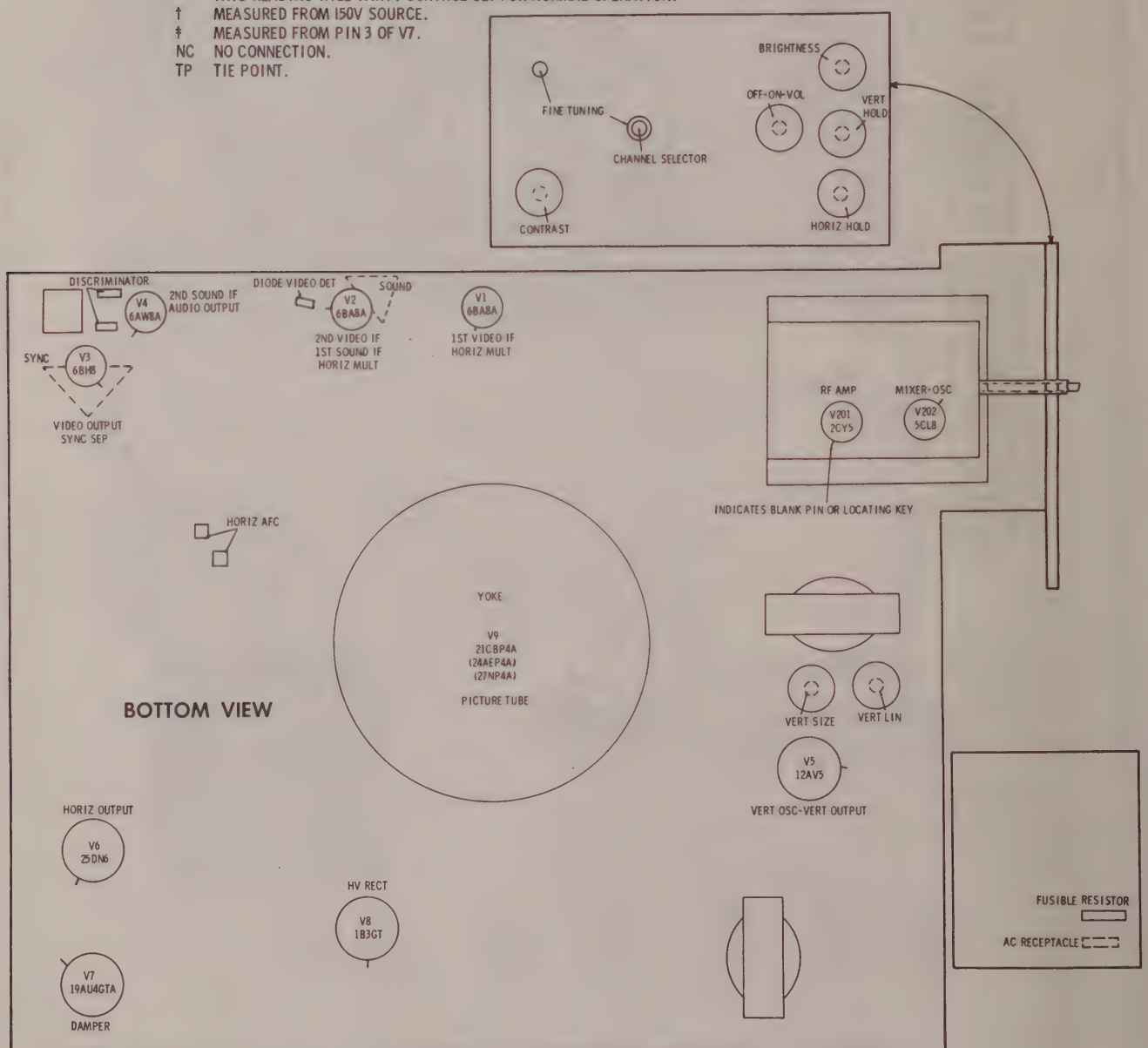
• THIS READING WILL VARY. CONTROL SET FOR NORMAL OPERATION.

† MEASURED FROM 150V SOURCE.

‡ MEASURED FROM PIN 3 OF V7.

NC NO CONNECTION.

TP TIE POINT.



TUBE PLACEMENT CHART

DISASSEMBLY INSTRUCTIONS

CHASSIS REMOVAL

1. Remove 4 metal screws holding the rear cover. Remove the tuner antenna leads and the rear cover.
2. Remove 7 push-on type knobs from the top.
3. Remove the speaker leads.
4. Remove 5 phillips head screws holding the front and remove the front.
5. Remove 4 metal screws holding the top chassis bracket.
6. Remove 5 chassis bolts from the bottom.
7. Remove 3 metal screws holding the picture tube bracket.
8. Remove the chassis from the front.

CAUTION NOTE

ONE SIDE OF AC LINE CONNECTED TO CHASSIS
Care should be exercised when connecting test equipment or physically contacting the chassis.

MODEL F3202C (CH. 8H25)

TRADE NAME	Philco	MODELS	CHASSIS
		F3042F, G, F3044A, S, WA, F3202C, F3204B, L, M	8H25
		UF3042F, G, UF3044A, S, WA, UF3202C, UF3204B, L, M	8H25U
		F4221, L, F4222, L, F4629, L, W	8L35
		UF4221, L, UF4222, L, UF4629, L, W	8L35U
MANUFACTURER	Philco Corp., Tioga & "C" Streets, Philadelphia, Pa.		
TYPE SET	Television Receiver		
TUBES	Fifteen		
POWER SUPPLY	110-120 Volts AC, 60 Cycle	RATING 155 Watts, 1.5 Amp. @ 117 Volts AC	
TUNING RANGE	Channels 2 thru 13 VHF, 14 thru 83 UHF, Video IF 45.75MC, Sound IF 41.25MC (Intercarrier)		

SERVICING IN THE FIELD

TUNER OSCILLATOR ADJUSTMENTS

Touch-up adjustment of the VHF Oscillator is possible by removing the Channel Selector and Fine Tuning knobs. Set the Fine Tuning at the center of its range. The adjustments (located in a circle aound the shaft) should be made in sequence from the highest to the lowest channel in the area. Channel 13 adjustment is located at 12 o'clock, proceed in a counterclockwise direction adjusting for best picture and sound.

PICTURE TUBE SAFETY GLASS CLEANING

Remove the 5 phillips head screws holding the front to the cabinet. Remove the front containing the safety glass.

SPECIAL ADJUSTMENTS

A. Focus
The focus may be varied in steps by the position of a plug in the Focus Adjustment board.

B. Height And Vertical Linearity
These adjustments are accessible by removing the rear cover, the Brightness and Vertical Hold knobs.

C. Width
The Width may be varied by means of a switch located behind the AC interlock.

HORIZONTAL OSCILLATOR FIELD ADJUSTMENTS

Set Horizontal Hold to center of its range and adjust Horizontal Hold Centering (R5) until picture synchronizes horizontally.

SOUND IF DETECTOR BUZZ ADJUSTMENT

To eliminate intercarrier buzz, adjust the Buzz Control for MINIMUM buzz and maximum sound. (For location, see tube placement chart.)

FUSE DEVICE

A 5.6Ω fusible resistor (R60) is used for low voltage power supply protection. (For location, see tube placement chart.)

CENTERING

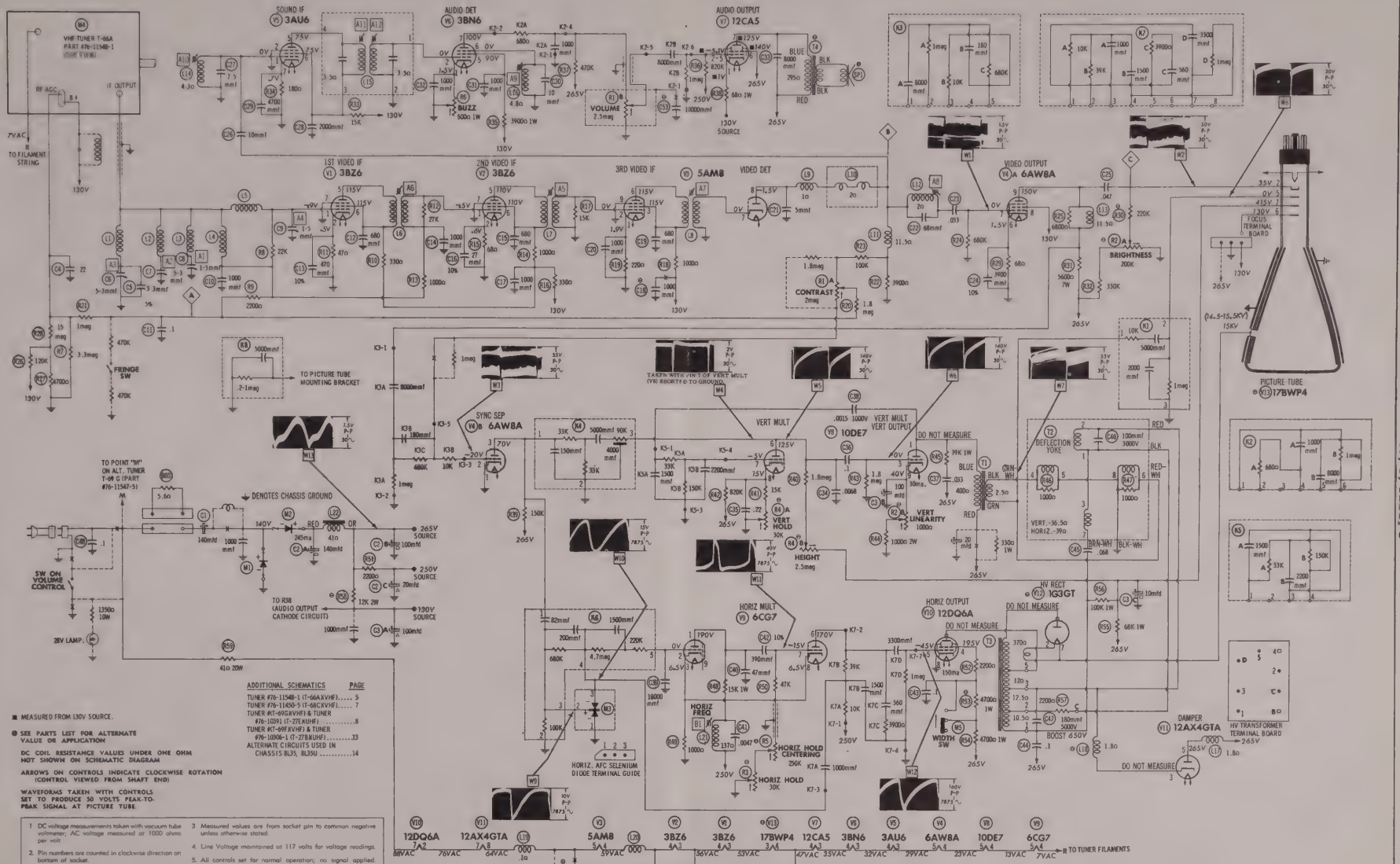
Centering is accomplished mechanically by adjusting two magnetic rings around the neck of the picture tube. Rotate the two rings around the neck of the tube until the picture is properly centered.

HOWARD W. SAMS & CO., INC. • Indianapolis 5, Indiana

The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed. Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. © 1958 Howard W. Sams & Co., Inc., Indianapolis 5, Indiana. Printed in U.S. of America

H559

SET 409 FOLDER 3
PHILCO
CHASSIS 8H25, U, 8L35, U



ADDITIONAL SCHEMATICS — PAGE

TUNER #76-11548-1 (T-66AXVHF)..... 5
TUNER #76-11450-5 (T-68CXVHF)..... 7
TUNER #T-69GXVHF) & TUNER #76-1(D9)1 (T-27EXUHF)..... 8
TUNER #T-69FXVHF) & TUNER #76-1(B06-1 (T-27BXUHF)..... 33
ALTERNATE CIRCUITS USED IN CHASSIS 8L35, 8L35U..... 14

■ MEASURED FROM 130V SOURCE.

● SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM

ARROWS ON CONTROLS INDICATE CLOCKWISE ROTATION (CONTROL VIEWED FROM SHAFT END)

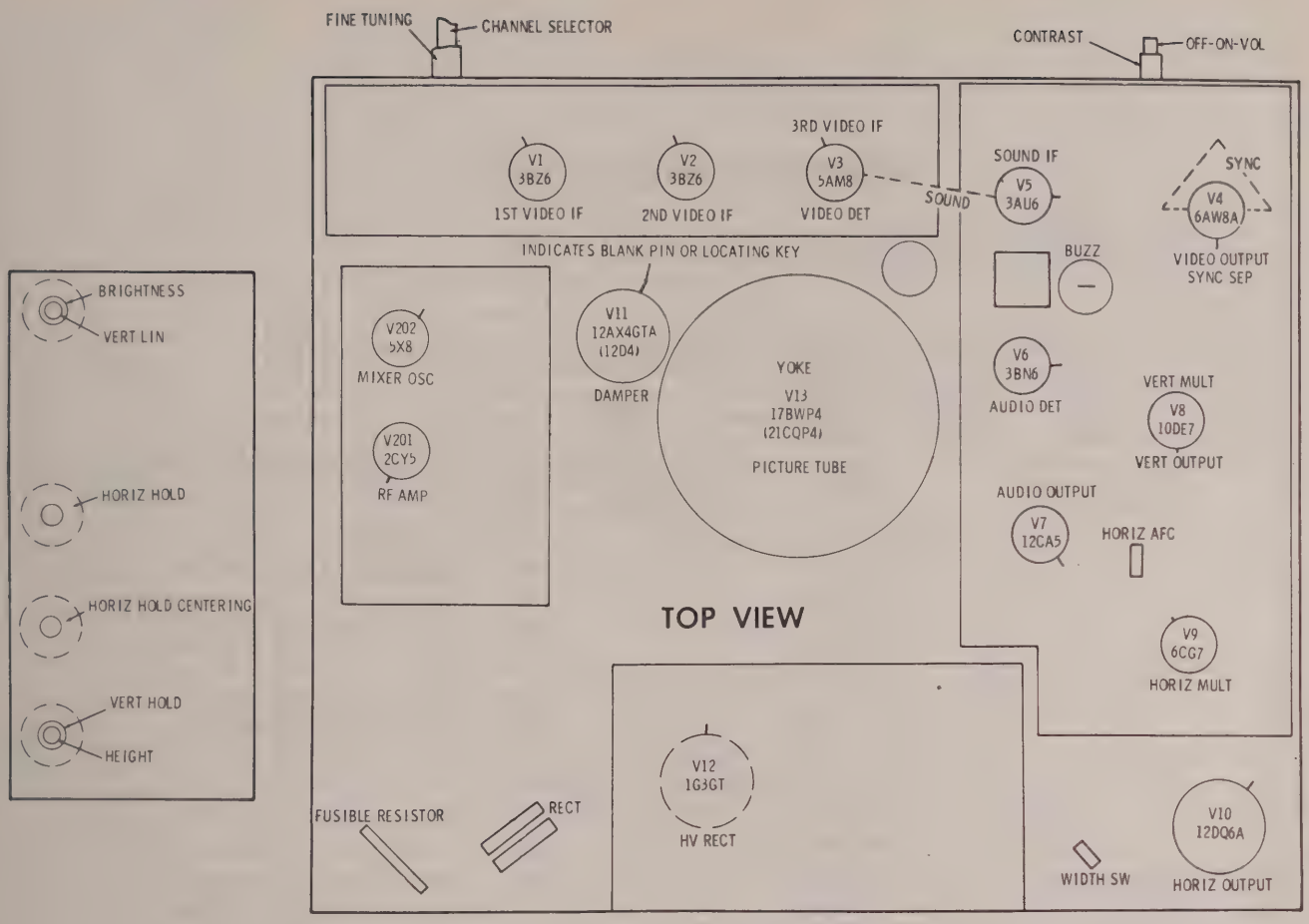
WAVEFORMS TAKEN WITH CONTROLS SET TO PRODUCE 50 VOLTS PEAK-TO-PEAK SIGNAL AT PICTURE TUBE

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltage measured on 1000 ohms per volt
2. Pin numbers are counted in clockwise direction on bottom of socket.
3. Measured values are from socket pin to common negative unless otherwise stated.
4. Line Voltage maintained at 117 volts for voltage readings.
5. All controls set for normal operation; no signal applied.

A PHOTOFACT STANDARD NOTATION SCHEMATIC
© Howard W. Sams & Co., Inc. 1958

PHILCO
CHASSIS 8H25, U, 8L35, U

TUBE PLACEMENT CHART



TUBE FAILURE CHECK CHART

The following chart lists tubes whose failures are most likely to produce indicated symptoms. Refer to tube placement chart for location and type of tube.

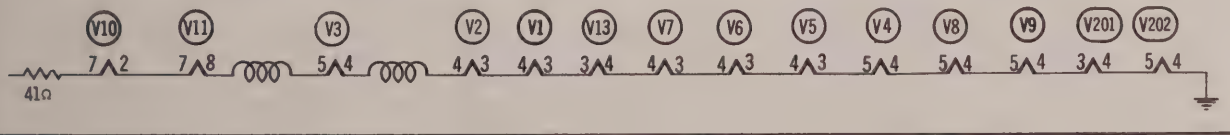
POWER SUPPLY FAILURE
No raster, no sound Fusible Resistor (R60), Rectifier (M1, M2)

SWEEP FAILURE
No raster, has sound M3, V10, V11, V12, V13
No vertical deflection V8
Poor vert. linearity or foldover V8
Poor horiz. linearity or foldover V9, V10, V11
Narrow picture V9, V10, V11, M1, M2
Vert. off freq. V8
Horiz. off freq. V9

LOSS OF PICTURE OR SOUND
No pic, no sound, has raster V1, V2, V3, V7
No pic, no sound, has snow V201, V202, V1, V7
No pic, has sound, has raster V4, V13
Has pic, no sound V5, V6, V7

SYNC FAILURE
No vert. sync V4
No horiz. sync V4, Rectifier (M3)
No vert. or horiz. sync V4

This receiver employs tubes used in a series filament network, an open filament in any tube will cause the set to be inoperative. (See circuit below.)



PHILCO
CHASSIS 8H25, U, 8L35, U

FOLDER 3

ALIGNMENT INSTRUCTIONS

PRE-ALIGNMENT INSTRUCTIONS

USE AN ISOLATION TRANSFORMER TO PROTECT THE TEST EQUIPMENT.
The High Voltage lead should be securely taped and kept away from the chassis.
Allow a 20 minute warm-up period for the receiver and test equipment.

VIDEO IF ALIGNMENT

Connect the negative lead of a 4.5 volt bias supply to point Ⓐ . Positive to chassis.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.
Use only enough sweep generator output to provide a usable pattern on scope.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
1.	Direct	High side to ungrounded tube shield floating over Mixer-Osc. tube (V202). Low side to chassis.	Not used.	47.4MC (400∿ 30% AM Mod)	4	Vert. Amp. thru 10K to point Ⓑ . Low side to chassis. (Across video detector load).	Mixer Plate Coil	Use only enough generator output to provide a usable indication on VTVM.
2.	"	"	"	41.25MC (Crystal Accuracy)	"	"	A1	Increase generator output. Adjust for MINIMUM 400∿ indication.
3.	"	"	"	47.4MC (Crystal Accuracy)	"	"	A2, A3	Increase generator output. Adjust for MINIMUM 400∿ indication. Repeat steps 2 and 3.
4.	"	"	"	45.0MC	"	"	Mixer Plate Coil	Use only enough generator output to provide a usable indication on VTVM. Adjust for maximum 400∿ indication on scope.
5.	"	"	"	42.7MC	"	"	A4, A5	"
6.	"	"	"	45.75MC	"	"	A6	"
7.	"	"	"	43.85MC	"	"	A7	"
8.	Two 120Ω Carbon Resistors	Across antenna terminals with 120Ω in each lead.	"	65.75MC	"	"	Fine Tuning	Adjust Fine Tuning for MINIMUM 400∿ indication on scope. DO NOT change Fine Tuning during balance of alignment.
9.	"	"	69MC (10MC Swp)	42.7MC 43.85MC 45.0MC 45.75MC	"	"		Check for response similar to Fig. 1. If necessary, retouch Mixer Plate Coil to set carrier level, A7 to adjust curve limit, A5 and A4 to adjust low frequency slope of curve and A6 to adjust high frequency side.

4.5MC TRAP ALIGNMENT

The detector used in alignment of the 4.5MC trap must first be padded by connecting to an accurate source of 4.5MC and a VTVM to the output.
Adjust the slug for maximum deflection.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
10.	.005mfd	High side to point Ⓑ . Low side to chassis.	4.5MC (400∿ 30% AM Mod)	Any non-interfering channel	DC probe thru detector probe (Fig. 2) to cathode of picture tube (point Ⓒ). Common to chassis.	A8	Adjust for MINIMUM deflection.

SOUND IF ALIGNMENT

Tune in a weak station signal (antenna disconnected) and adjust for best picture. Do not change setting of Fine Tuning during balance of alignment.
Set the Buzz Control (R6) to the center of its range.
Connect the antenna for a strong signal. Adjust A9 for maximum sound. Use peak furthest counterclockwise.
Disconnect antenna. Adjust A10, A11 and A12 for maximum sound.
With the antenna still disconnected, back off on the Contrast Control and adjust the Buzz Control for MINIMUM buzz and noise.
Reset the Contrast Control for normal contrast and retouch A10, A11 and A12 for maximum sound.
Connect antenna. Retouch A9 for maximum sound.

TUNER ALIGNMENT INSTRUCTIONS LOCATED ON PAGE 6.

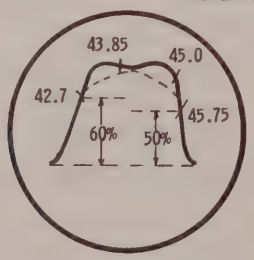


FIG. 1

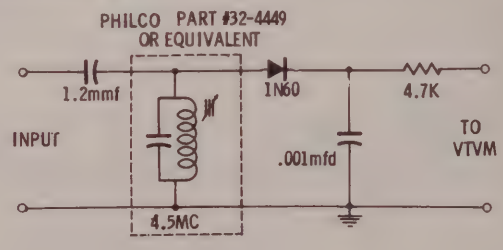
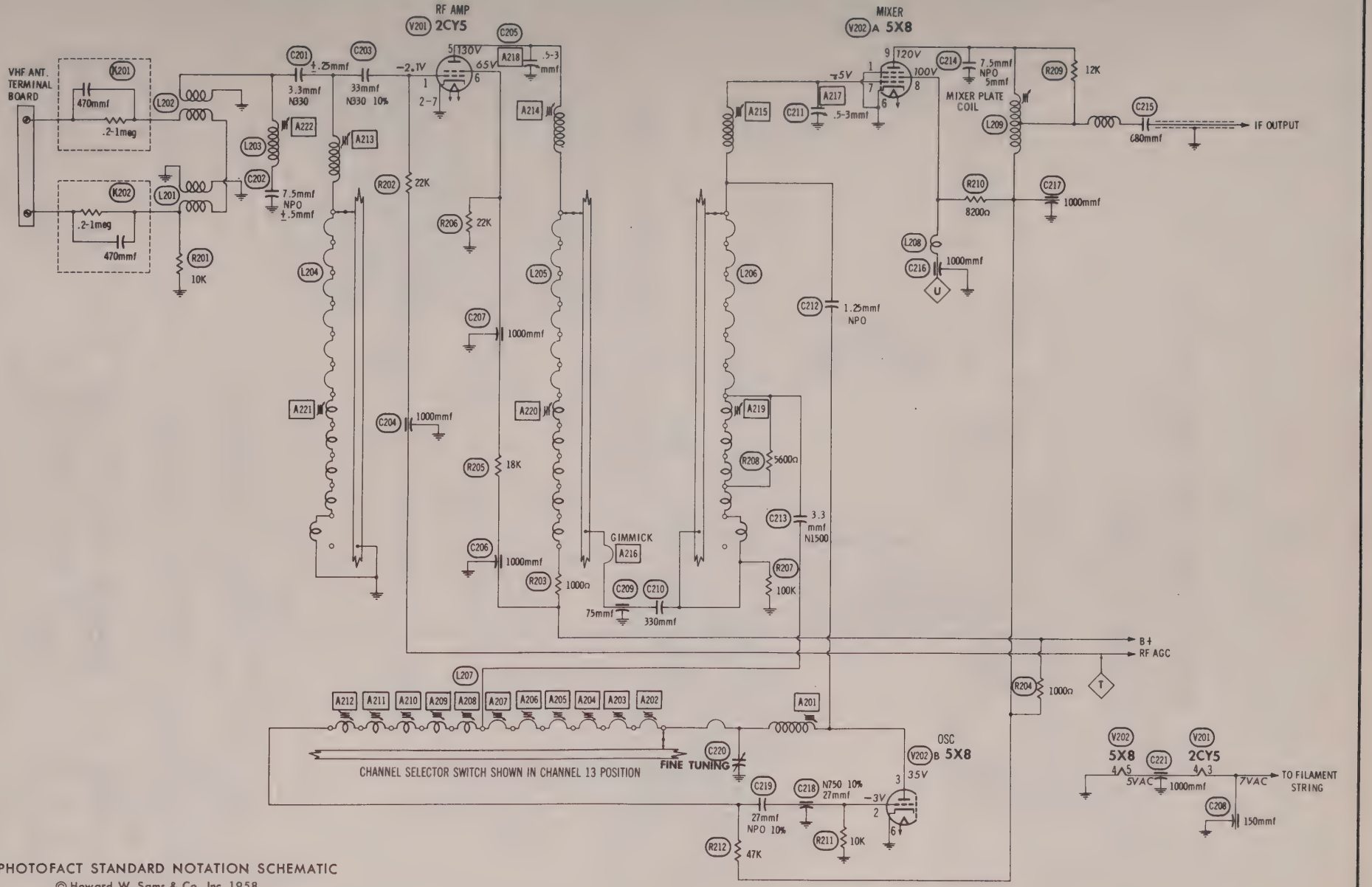


FIG. 2



A PHOTOFACT STANDARD NOTATION SCHEMATIC

© Howard W. Sams & Co., Inc. 1958

VHF TUNER #76-11548-1 (T-66A)

PHILCO
CHASSIS 8H25, U, 8L35, U

TUNER ALIGNMENT INSTRUCTIONS

PRE-ALIGNMENT INSTRUCTIONS

USE AN ISOLATION TRANSFORMER TO PROTECT THE TEST EQUIPMENT.
The High Voltage lead should be securely taped and kept away from the chassis.
Allow a 20 minute warm-up period for the receiver and test equipment.

VHF OSCILLATOR ALIGNMENT

The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.
Set the Fine Tuning to the center of its range.
Use only enough sweep generator output to provide a usable pattern on scope.
This procedure uses the traps of the Video IF strip. They must be in proper alignment before attempting to align the oscillator.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
1.	Two 120Ω Carbon Resistors	Across VHF antenna terminals with 120Ω in each lead.	Not used	209.75MC (400∿ 50% AM Mod)	13	Across video detector load.	A201	Adjust for MINIMUM 400∿ indication.
				203.75MC	12		A202	
				197.75MC	11		A203	
				191.75MC	10		A204	
				185.75MC	9		A205	
				179.75MC	8		A206	
				173.75MC	7		A207	
				81.75MC	6		A208	
				75.75MC	5		A209	
				65.75MC	4		A210	
				59.75MC	3		A211	
				53.75MC	2		A212	

VHF RF AND MIXER ALIGNMENT

Connect the negative lead of a 1.5 volt bias supply to point (1). Positive to chassis.
Detune Mixer Plate Coil by connecting a 10 to 20mmf capacitor across it temporarily.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.
Use only enough sweep generator output to provide a usable pattern on scope.
Use 10MC sweep unless otherwise noted.

	DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
2.	Two 120Ω Carbon Resistors	Across VHF antenna terminals with 120Ω in each lead.	213MC	211.25MC 215.75MC	13	Vert. Amp. thru 10K to point (1). Low side to chassis.	A213, A214, A215	Adjust for maximum gain and symmetry of response similar to Fig. 201 with markers as shown.
3.	"	"	"	"	"	"	A216	Adjust "Gimmick" (A216) by changing its position with respect to the 300mmf capacitor located adjacent to it. Moving closer narrows the bandpass and moving away increases bandpass. Adjust for bandwidth shown in Fig. 201.
4.	"	"	177MC	175.25MC	7	"	A217, A218	Adjust to obtain correct tilt on top of curve as in Fig. 202 to compensate for the tuning effect of channel 13.
5.	"	"	213MC	213MC	13	"		Retouch A14 and A15 for symmetrical response centered about marker. To retouch only turn cores SLIGHTLY. Repeat step 4 and 5 alternately until optimum response is obtained on channels 7 and 13.
6.	"	"	85MC	85MC	6	"	A219, A220, A221	Turn A219 counterclockwise until a single peak appears. (DO NOT unscrew far enough to allow the core to fall out.) Adjust A220 until peak falls of 85MC. (It may be necessary to increase sweep generator output. Adjust A221 for maximum amplitude and symmetry of single peak.
7.	"	"	"	83.25MC 87.75MC	"	"		Retouch A219 and A220 for response similar to Fig. 203.
8.	Two 120Ω Carbon Resistors	Across VHF antenna terminals with 120Ω in each lead.	Not used	43.5MC (400∿ 30% AM Mod)	4	Vert. Amp. across video detector load. Low side to chassis.	A222	Adjust for MINIMUM scope indication.

UHF TUNER ALIGNMENT

This portion of the receiver has been properly aligned at the factory and is very stable. Alignment of this portion should not be required in the field.

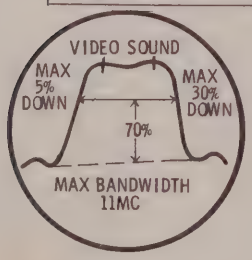


FIG.201

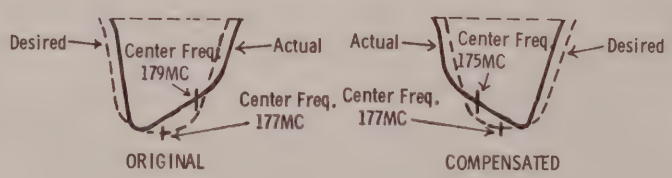


FIG.202

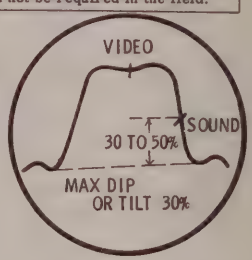
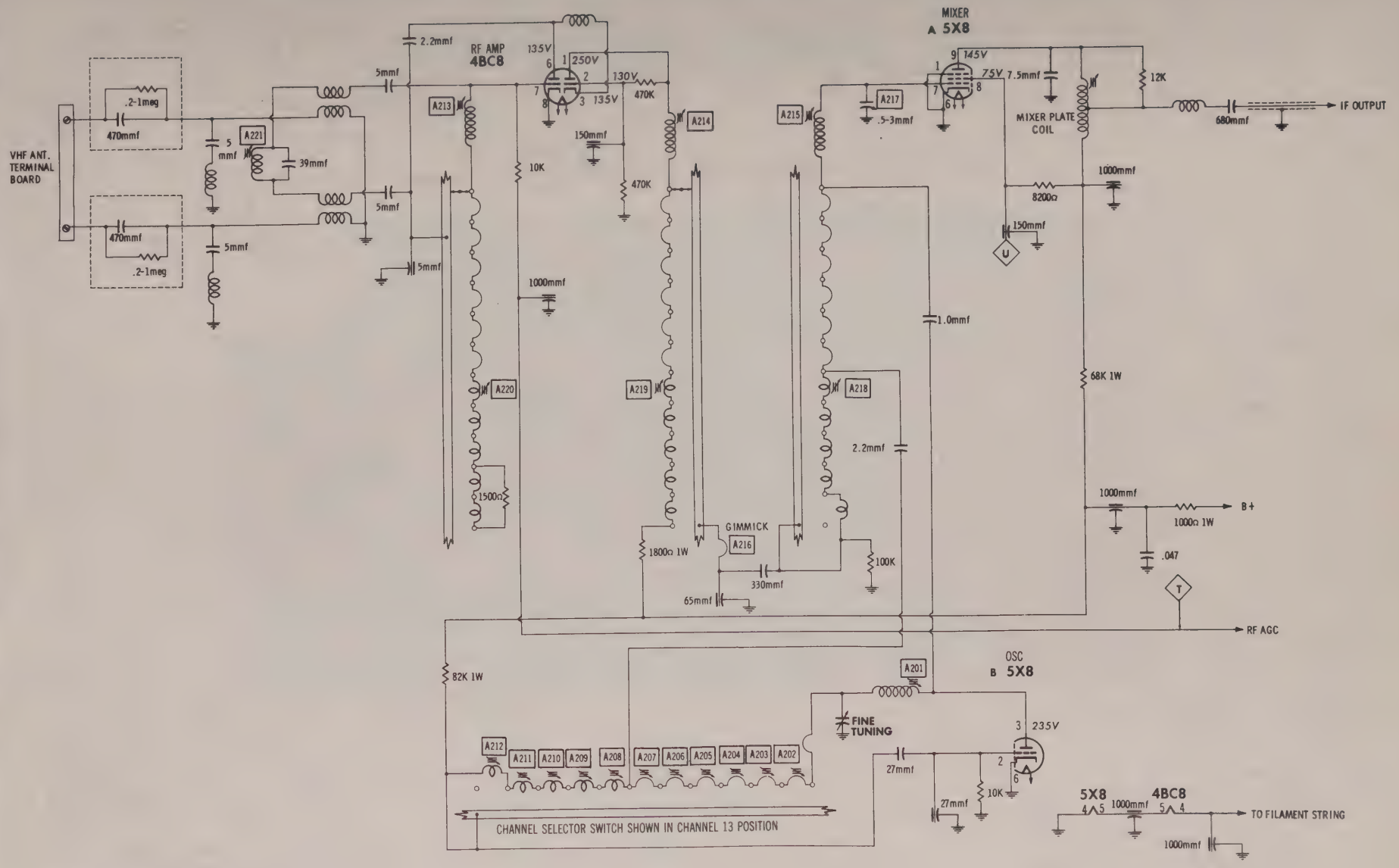


FIG.203

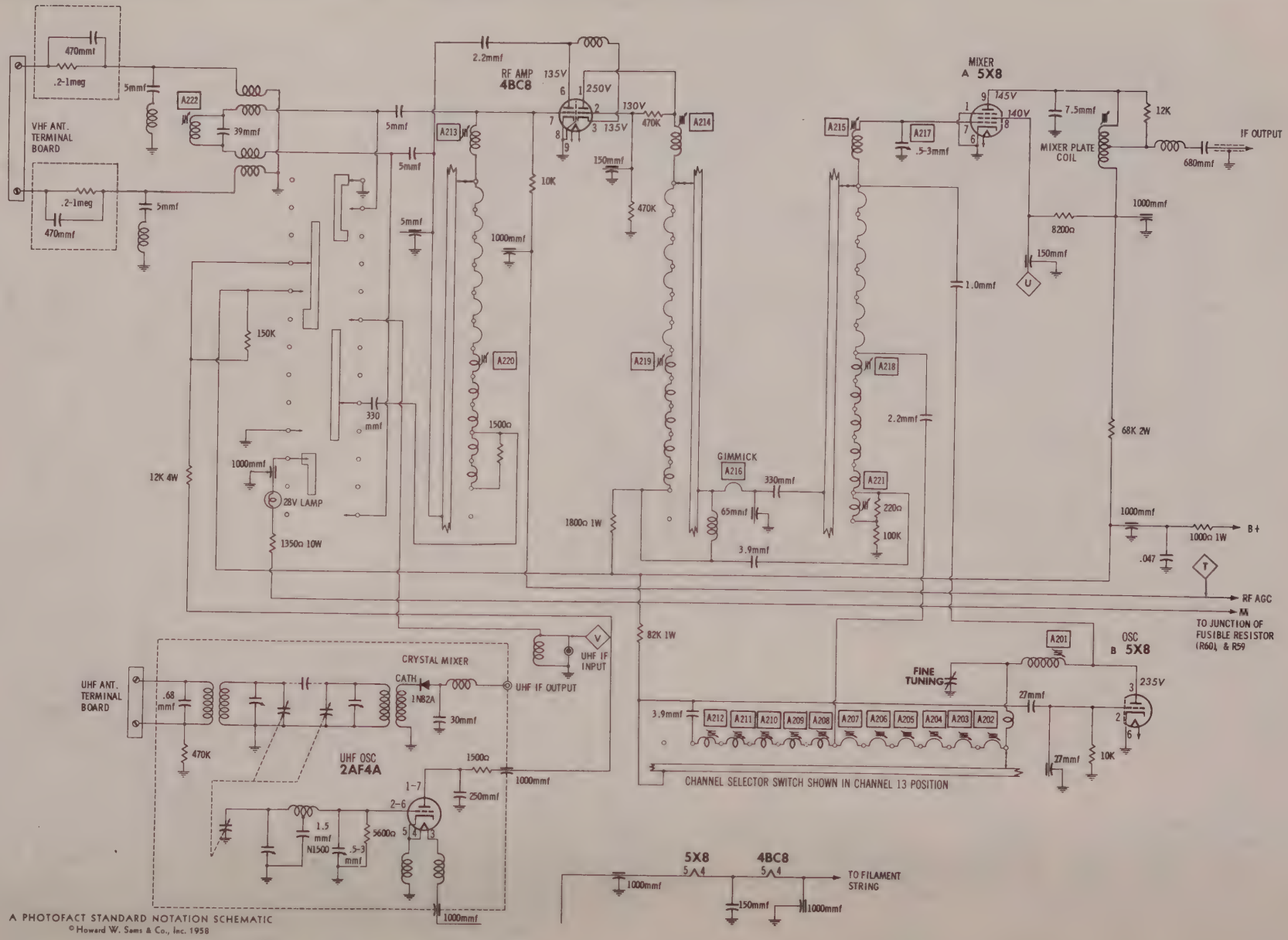


A PHOTOFACT STANDARD NOTATION SCHEMATIC

© Howard W. Sams & Co., Inc. 1958

VHF TUNER #76-11450-5 (T-68C)

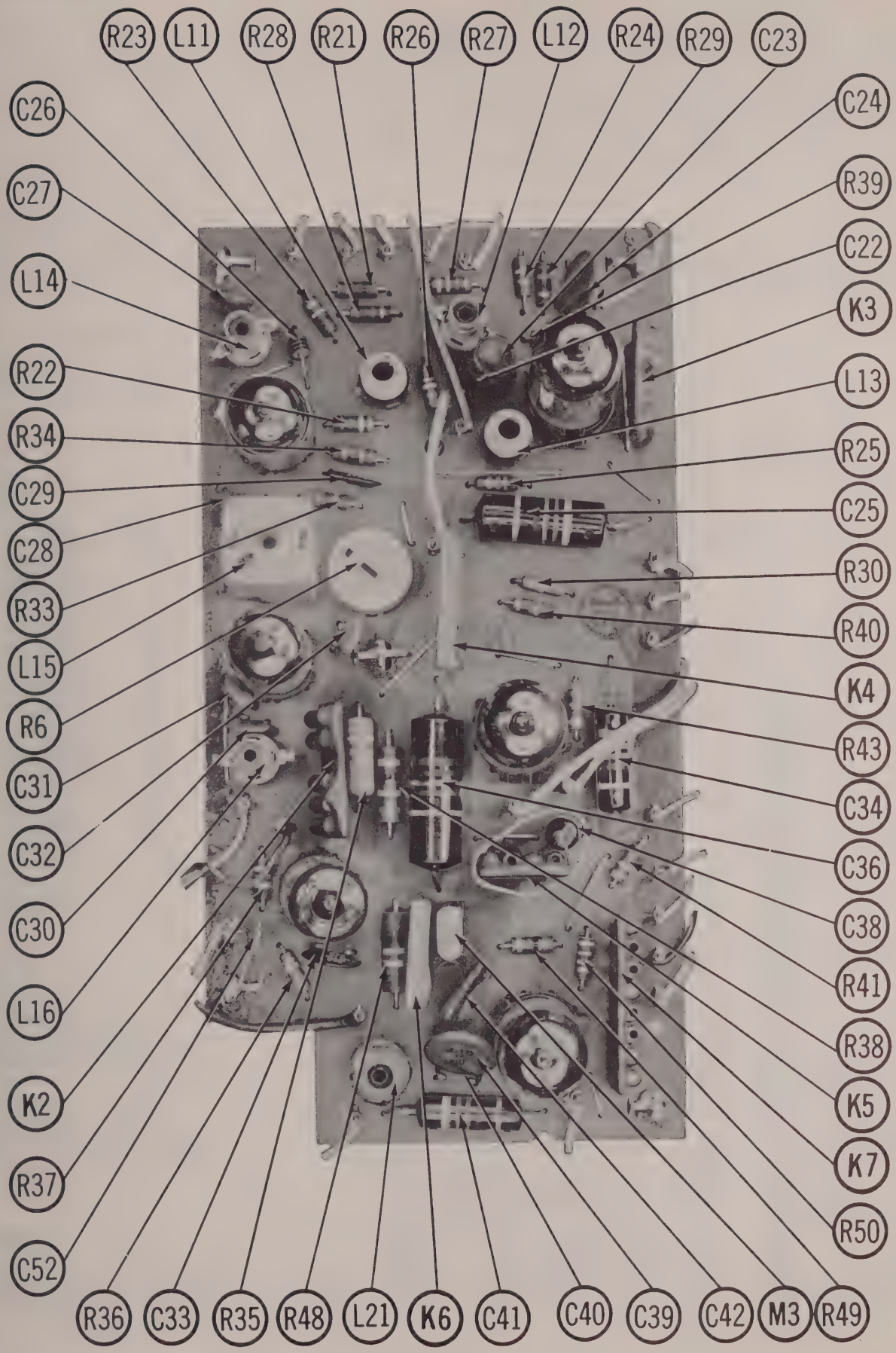
PHILCO
CHASSIS 8H25, U, 8L35, U



A PHOTOFACT STANDARD NOTATION SCHEMATIC

©Howard W. Sams & Co., Inc. 1958

TUNERS #76-10391 (T-27E) (UHF) & T-69G (VHF with UHF provisions)



MAIN PRINTED BOARD

SET 409 FOLDER 3

PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No	USE	TYPE	NOTES
V1	1st Video IF Amp.	3BZ6	
V2	2nd Video IF Amp	3BZ6	
V3	3rd Video IF Amp - Video Detector	5AM8	
V4	Video Output-Sync Sep	6AW8A	
V5	Sound IF Amp	3AU6	
V6	Audio Detector	3BN6	

ITEM No	USE	TYPE	NOTES
V7	Audio Output	12CA5	
V8	Vert Mult -Vert. Output	10DE7	
V9	Horiz Mult.	6CG7	
V10	Horiz Output	12DQ6A	
V11	Damper	12AX4GTA	Note 1
V12	HV Rect	1G3GT	

Note 1. Ch. 8L35, U use 12D4 in this application.

PICTURE TUBE

ITEM No	REPLACEMENT DATA: PHILCO PART No	GENERAL ELECTRIC PART No	RCA PART No	SYLVANIA PART No	NOTES
V13	17BWP4 21CQP4		17BWP4 ① 21CQP4 ②	17BWP4 ② 21CQP4 ③	① "Silverama" ③ ② "Silver Screen 65"

ELECTROLYTIC CAPACITORS

ITEM No	RATING: CAP.	VOLT	REPLACEMENT DATA: PHILCO PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1	140	150	30-2568-70	AFHS1-23	XA028I	FPU7	TM3-24	FM-15150	TVL-1426
C2A	140	300	30-2590-26 ①	AFHS3-26-50	D003S			Q-011	R3680 *
B	100	300			BR435			MT-4580 *	
C	20	300							
C3A	100	200	30-2590-25	AFH3-177-60				T-180	R3679 *
B	100	50						MT-25100	
C	40	450							

① Ch. 8L35, U use a 4 section 140/100/30/30 @ 300V (Part #30-2590-27). * Non-catalog item.

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING: CAP.	VOLT	REPLACEMENT DATA: PHILCO PART No	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C4	.22	200	30-4650-49	P288N-22					
C5	3.3		30-1263-3		DTZ-3R3				5%
C6	3-3		31-6535-1						
C7	5-3		31-6535-1						
C8	1-5		31-6535-2						
C9	1-5		31-6535-2						
C10	1000		30-1262-11	BPD-001	DD-102	BYA8D1	DC521	5HK-D1	
C11	.1	200	30-4650-47	P288N-1	DF-104	CUB2P1	GEM-201	2TM-P1	
C13	680		30-1262-15	BPD-00068	DD-681	BYA10T68	UC-5368	5GA-T68	
C13	470		30-1262-18		DE-471	5R8T47		MS-347	10%
C14	1000		30-1262-11	BPD-001	DD-102	BYA8D1	DC521	5HK-D1	
C15	680		30-1262-15	BPD-00068	DD-681	BYA10T68	UC-5368	5GA-T68	
C16	27		30-1263-6		TCZ-27	CUQ27C			10%
C17	1000		30-1262-11	BPD-001	DD-102	BYA8D1	DC521	5HK-D1	
C18	1000		30-1262-11	BPD-001	DD-102	BYA8D1	DC521	5HK-D1	①
C19	680		30-1262-15	BPD-00068	DD-681	BYA10T68	UC-5368	5GA-T68	
C20	1000		30-1262-11	BPD-001	DD-102	BYA8D1	DC521	5HK-D1	
C21	5		30-1263	NPO-D1 5	DTZ-4R7	C10V5C	ZT-555	5TCCB-V5	
C22	68		30-1263-4	DI-000068	DD-680	L10Q68	UC-5468	5GA-C68	
C23	.033	200	30-4684-27	P288N-033		BC2S3J		2SK-S33	
C24	3900		30-1262-44	1484-0039		1R5D39		MS-239	10%
C25	.047	400	30-4650-45	P488N-047	DF-503	CUB4S47	GEM-4147	4TM-S47	
C26	10		30-1226-51	S110	D6-100	LT9Q1	UC-541	5GA-Q1	
C27	7.5		30-1263-37						
C28	2000		30-1262-7	BPD-002	DD-202	BYA10D2	DC522	5HK-D2	
C29	4700		30-1262-2	BPD-0047	DD-472	BYA10D47	UC-5247	5HK-D47	
C30	10		30-1263-36	DI-00001	DD-100	L10Q1	UC-541	5GA-Q1	
C31	1000		30-1238-3	BPD-001	DD-102	BYA8D1	DC521	5HK-D1	
C32	1000		30-1262-12	BPD-001	DD-102	BYA8D1	DC521	5HK-D1	
C33	9000		30-1262-1						
C34	.0068	400	30-4650-57	P488N-0068	D6-682	CUB6D68	GEM-6268	6TM-D68	
C35	.22	100	30-4650-49	P288N-22		CUB2P22	GEM-2022	2TM-P22	
C36	.047	400	30-4650-47	P488N-1	DF-104	CUB4P1	GEM-401	4TM-P1	
C37	.033	400	30-4650-44	P488N-033		CUB4S33	GEM-4133	4TM-S33	
C38	.0015	1000	30-1262-43	P10S8N-0015	DDS5-152	CUB1D15	GEM-10215	10TM-D15	
C39	18000		30-1262-26						
C40	47		30-1264-3	1469-000047	D6-470	22R5Q47		MS-447	10%
C41	.0047	400	30-4650-56	P488N-0047	D6-472	CUB6D47	GEM-6247	6TM-D47	
C42	390		30-1264-1	1469-00039	D6-391	5R5T39		MS-339	10%
C43	.1	400	30-4650-47	P488N-1	DF-104	CUB4P1	GEM-401	4TM-P1	
C44	.1	400	30-4650-47	P488N-1	DF-104	CUB4P1	GEM-401	4TM-P1	
C45	.068	400	30-4650-46	P488N-068		CUB4S68	GEM-4168	4TM-S68	
C46	100	3000	30-1248-14	BVD-30-100	DD30-101	BVB30T1		30GA-T1	
C47	180	5000	30-1246-16		DD60-181		DC60318		
C48	.1	600	30-4650-54	P688N-1	DF-104	CUB6P1	GEM-601	6TM-P1	
C49	1000		30-1262-11	BPD-001	DD-102	BYA8D1	DC521	5HK-D1	①
C50	1000		30-1262-11	BPD-001	DD-102	BYA8D1	DC521	5HK-D1	
C51	1000		30-1262-11	BPD-001	DD-102	BYA8D1	DC521	5HK-D1	
C52	470		30-1238-10	BPD-00047	DD-471	BYA10T47	UC-5347	5GA-T47	
C53	10000		30-1238-2	BPD-01	DD-103	BYA8S1	DC51	5HK-S1	

① Not used in some versions

CONTROLS

ITEM No	RATING: RESISTANCE	WATTS	REPLACEMENT DATA: PHILCO PART No	CENTRALAB PART No	CLAROSTAT PART No	IRC PART No	MALLORY PART No.	INSTALLATION NOTES
R1A	2meg	½	33-5692-15		RTV-660	* QJ-1090	** UES8256	Contrast
B	2.5meg	½			Not Req.			Volume
C	Switch				Not Req.			
R2A	200K	½	33-5592-16	F1-24 †		* QJ-970		Brightness, Note 1
B	1000Ω	½		R3-4 †				Vert. Lin., Note 1
R3A	30K	½	33-5593-14	F1-28 †		* QJ-968		Horiz. Hold, Note 2
B	Shaft			Not Req.				
R4A	30K	½	33-5592-22	F1-27 †		* QJ-969		Vert. Hold, Note 3
B	2.5meg	½		R2-76 †				Height, Note 3
R5A	250K	½	33-5593-15	AB-50	A47-250K-S	QJ-130		Horiz. Hold Centering, Note 2
B	Shaft			AK-19 †	RN-3 †	TQ †		
R6	600Ω	1(WW)	33-5591-6					Buzz

Note 1. Chassis 8L35, U use Brightness 250K, Vert. Lin. 12000 in this application (Part #33-5692-16).
Note 2. Chassis 8L35, U use Dual Control: Horiz. Hold 30K, Horiz. Hold Centering 250K in this application. (Part #33-5592-21).
Note 3. Chassis 8H25 Run I use Vert. Hold 20K, Height 2.5meg in this application (Part #33-5592-17). Chassis 8L35, U use alternate 30K and 2.5meg (Part #33-5592-20).
* "Concentrikit" Equivalent K-15 Kit, Base Elements & Shafts Bil-139, P17-024 (Panel) Bil-140, RJ-106 (Rear) 76-1 Switch
** "STA-LOC" Equivalent: FB26R, C6T50, RU355A, EI1250, U8-41.
† Saw shaft to proper length.
† "Concentrikit" Equivalent K-5 Kit, Base Elements & Shafts Bil-130, P1-020 (Panel) Bil-108, R15-006 (Rear)
■ Not available as a factory assembled control.
* "Concentrikit" Equivalent K-5 Kit, Base Element & Shaft Bil-121, P1-020
▲ "Concentrikit" Equivalent K-5 Kit, Base Elements & Shafts Bil-121, P1-020 (Panel) Bil-239, R15-005 (Rear)

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING: OHMS	WATT	PHILCO PART No.	NOTES
R7	3.3meg		66-5338340	
R8	22K		66-3228340	
R9	2200Ω		66-2228340	
R10	330Ω		66-1338340	
R11	47Ω		66-0478340	
R12	27K		66-3278340	
R13	1000Ω		66-2108340	
R14	1000Ω		66-2108340	
R15	68Ω		66-0688340	
R16	330Ω		66-1338340	
R17	15K		66-3158340	
R18	1000Ω		66-2108340	
R19	220Ω		66-1228340	
R20	1.8meg		66-5188340	
R21	1meg		66-5108340	
R22	3900Ω		66-2398340	
R23	100K		66-4108340	
R24	680K		66-4688340	
R25	6800Ω		66-2688340	
R26	120K		66-4128340	
R27	4700Ω		66-2478340	
R28	18meg		66-5188340	
R29	68Ω		66-0688340	
R30	220K		66-4228340	Note 1
R31	5800Ω	†	33-1335-140	
R32	330K		66-4338340	
R33	18K		66-3188340	

ITEM No.	RATING: OHMS	WATT	PHILCO PART No.	NOTES
R34	180Ω		66-1188340	
R35	3900Ω	1	66-2398340	
R36	820K		66-4828340	
R37	470K		66-4478340	
R38	68Ω	1	66-0684340	
R39	150K		66-4158340	
R40	1.8meg		66-5188340	
R41	15K		66-3158340	
R42	820K		66-4828340	
R43	1.8meg		66-5188340	
R44	1000Ω	2	66-2105340	
R45	39K	1	66-3394340	
R46	10000Ω		66-2108340	
R47	1000Ω		66-2108340	
R48	15K	1	66-3154340	
R49	10000Ω		66-2108340	
R50	47K		66-3478340	
R51	2200Ω		66-2228340	
R52	2200Ω		66-2228340	
R53	4700Ω	1	66-2474340	Note 2
R54	4700Ω	1	66-2474340	
R55	68K	1	66-3684340	
R56	100K	1	66-4104340	
R57	2200Ω		66-2228340	
R58	12K	2	66-3125340	Note 3
R59	4Ω	30	33-1366-1	
R60	5.8Ω		33-1366-3	

Note 1. Some versions use 180K in this application (Part #66-4188340).
Note 2. Some versions use 6800Ω 1W in this application.
Note 3. Chassis 8H25U uses 5600Ω 7W in this application (Part #33-1335-140). Chassis 8L35, U use 15K 2W (Part #66-3185340).

TRANSFORMERS (SWEEP CIRCUITS)

ITEM No.	USE	REPLACEMENT DATA: PHILCO PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	NOTES
T1	Vert. Output	32-8329-1	Z1900 ①	A-2823		A-8142 ②	28S72	A-106X	
T2A	Yoke-Horiz.(20MH)	76-10282-1 ③							
B	(100)-Vert.(36.5MH) Yoke	76-102823 ④							
M6	Rear Cover & Centering Device	76-10304-1							
T3	Yoke Clamp	28-13126-1							
	Horiz. Output	32-8830-1							

① Use 8 to 1 turns ratio.
② Drill new mounting hole(s).
③ Used in Ch. 8H25, U.
④ Used in Ch. 8L35, U.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE: PRI.	SEC.	REPLACEMENT DATA: PHILCO PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	NOTES
T4	5200Ω	3-4Ω	32-8747-2	Z1000 ①	A-3028	AU-601 ①	A-3877 ①	24S51 ①	S-6X	① Drill new mounting hole.

SPEAKER

ITEM No.	TYPE: SIZE	FIELD	V. C. IMP.	REPLACEMENT DATA: PHILCO PART No.	QUAM PART No.	NOTES
SP1	4"	PM	3-4Ω	36-1655-11 ①	4A07	① Used in Models using Ch. 8H25, U.
	4"	PM		36-1637 ②		② Alternate part number used in Models using Ch. 8H25, U.
	5 1/4" x 9 3/4"	PM		45-9733 ③		③ Used in Models F4221, L, UF4221, L
	25/8" x 63/4"	PM		36-1671-3 ④		④ Used in Models F4223, L, F4629, L, W, UF4223, L, UF4629, L, W

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA: PHILCO PART No.	Meissner PART No.	Merit PART No.	Miller PART No.	Ram PART No	NOTES
L1	47.4MC Trap	32-4645-33	19-1001	BC-662	4604		1.5 Microhenries
L2	47.4MC Trap	32-4645-19	19-1003	BC-663	4606		2.6 Microhenries
L3	41.25MC Trap	32-4645-17					3 Microhenries
L4	RF Choke	32-4645-36	19-3001	TV-189	6175	VP-8	.88 Microhenry
L5	1st. Video IF	32-4645-30			4684		.33 Microhenry
L6	2nd. Video IF	32-4686-2					
L7	3rd. Video IF	32-4686-2					
L8	4th. Video IF	32-4686-3					
L9	Resonant Choke	32-4645-7					3 Microhenries
L10	Resonant Choke	32-4674-1					22 Microhenries, 40MC
L11	Shunt Peaking Coil	32-4690-13	19-3500	TV-203	6138	VP-8	470 Microhenries
L12	4.5MC Trap	32-4644-11					
L13	Shunt Peaking Coil	32-4690-13	19-3500	TV-203	6138	VP-8	470 Microhenries
L14	1st. Sound IF	32-4644-12					
L15	2nd Sound IF	32-4745-2					
L16	Quadrature Coil	32-4644-13					
L17	RF Choke	32-4112-80	19-1005	BC-666	4622		11 Microhenries
L18	RF Choke	32-4113-43	19-3001	TV-189	6175	VP-8	.81 Microhenry
L19	Resonant Choke	32-4645-7					3 Microhenries
L20	Fil. Choke	32-4645-18					3 Microhenries

TRANSFORMER (HORIZ. OSC.)

ITEM No.	DC RES: PRI.	SEC.	REPLACEMENT DATA: PHILCO PART No.	Meissner PART No.	Merit PART No.	Miller PART No.	Ram PART No.	Thordarson PART No.	NOTES
L21	137Ω		32-4754-1						

FILTER CHOKE

ITEM No	RATINGS: CURRENT (Measured)	DC RES.	INDUCTANCE (0 CURRENT 1000 ^C.)	REPLACEMENT DATA: PHILCO PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
L22	.245A	41Ω	1.3 Hy.	32-8710-4					28C44	C-32X

COMPONENT COMBINATIONS

ITEM No.	USE	DESCRIPTION	PHILCO PART No.	REPLACEMENT DATA
K1	Blanking Coupling	5000mmf, 2000mmf, 10K, 1meg	30-8024-1	Sprague 101C48
K2	Audio Coupling	8000mmf, 1000mmf, 1meg, 880Ω	30-6511-2	
K3	Sync Coupling	180mmf, 6000mmf, 10K, 680K, 1meg	30-6510-3 ①	Sprague 103C35A
K4	Vertical Integrator	5000mmf, 150mmf, 4000mmf, 90K, 33K, 33K	30-8030-3 ②	Sprague 103C32
K5	Vertical Feedback	1500mmf, 2200mmf, 150K, 33K	30-8509-2	
K6	Horiz. AFC	82mmf, 200mmf, 1500mmf, 680K, 220K, 4.7meg, 100K	30-8016-2	
K7	Horiz. Coupling	1000mmf, 1500mmf, 560mmf, 3300mmf, 10K, 39K, 3900Ω, 1meg	30-8512-1 ③	
K8	Picture Tube Isolation	5000mmf, .2-1meg	30-8028-3	Sprague 141C8

① Ch. 8L35, U use Part #30-8515-1. ② Ch. 8L35, U use Part #30-8030-5. ③ Ch. 8L35, U use Part #30-8512-4.

RECTIFIERS

ITEM No.	RATING: CURRENT (Measured)	REPLACEMENT DATA: PHILCO PART No.	FEDERAL PART No.	GENERAL ELECTRIC PART No.	INTERNATIONAL PART No	SARKES TARZIAN PART No.	NOTES
M1	.245A	①②	HE500	1N1007 ③	TY500 ①	M500 ①	① Silicon Type.
M2	.245A	①②	HE500	1N1007 ③	TY500 ①	M500 ①	② Alternate Germanium Type, Part #34-8047-1
M3		34-8037-3 ④	HD615 ④		SD-91 ①		③ Germanium Type.
							④ Selenium Type.

MISCELLANEOUS

ITEM No.	PART NAME	PHILCO PART No.	NOTES
M4	Tuner	76-11548-1	T-66A, VHF Ch. 8H25
	Tuner	76-11450-5	T-66C, VHF Ch. 8L35
	Tuner		T-69F, UHF-VHF Ch. 8H25U
	Tuner		T-69G, UHF-VHF Ch. 8L35U
	Tuner	76-10306-1	T-27B, UHF Ch. 8H25U
	Tuner	76-10391	T-27E, UHF Ch. 8L35U
M5	Switch	42-2075-1	Width, Slide Type
M6	Centering Device	76-10304-1	Includes yoke rear cover
	Printed Board	54-6529	Video IF
	Printed Board	54-5286	Video, Sound & Sweep

PARTS LIST AND DESCRIPTIONS (Continued)

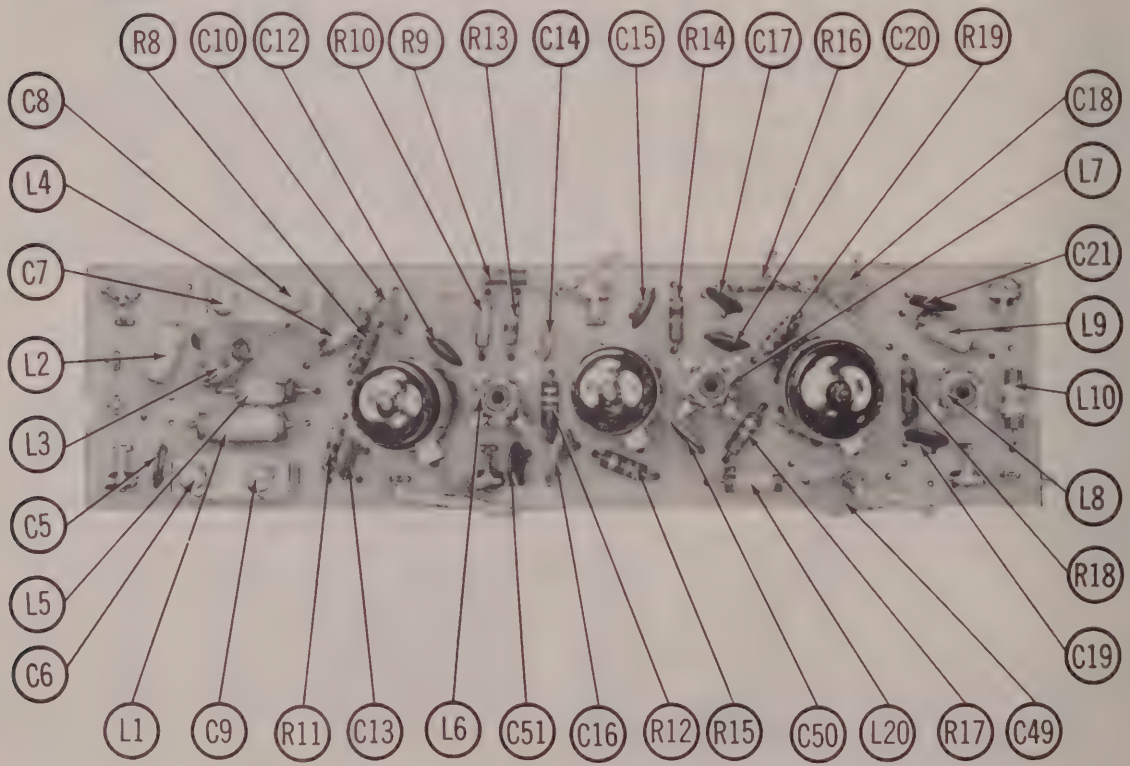
CABINETS & CABINET PARTS

(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

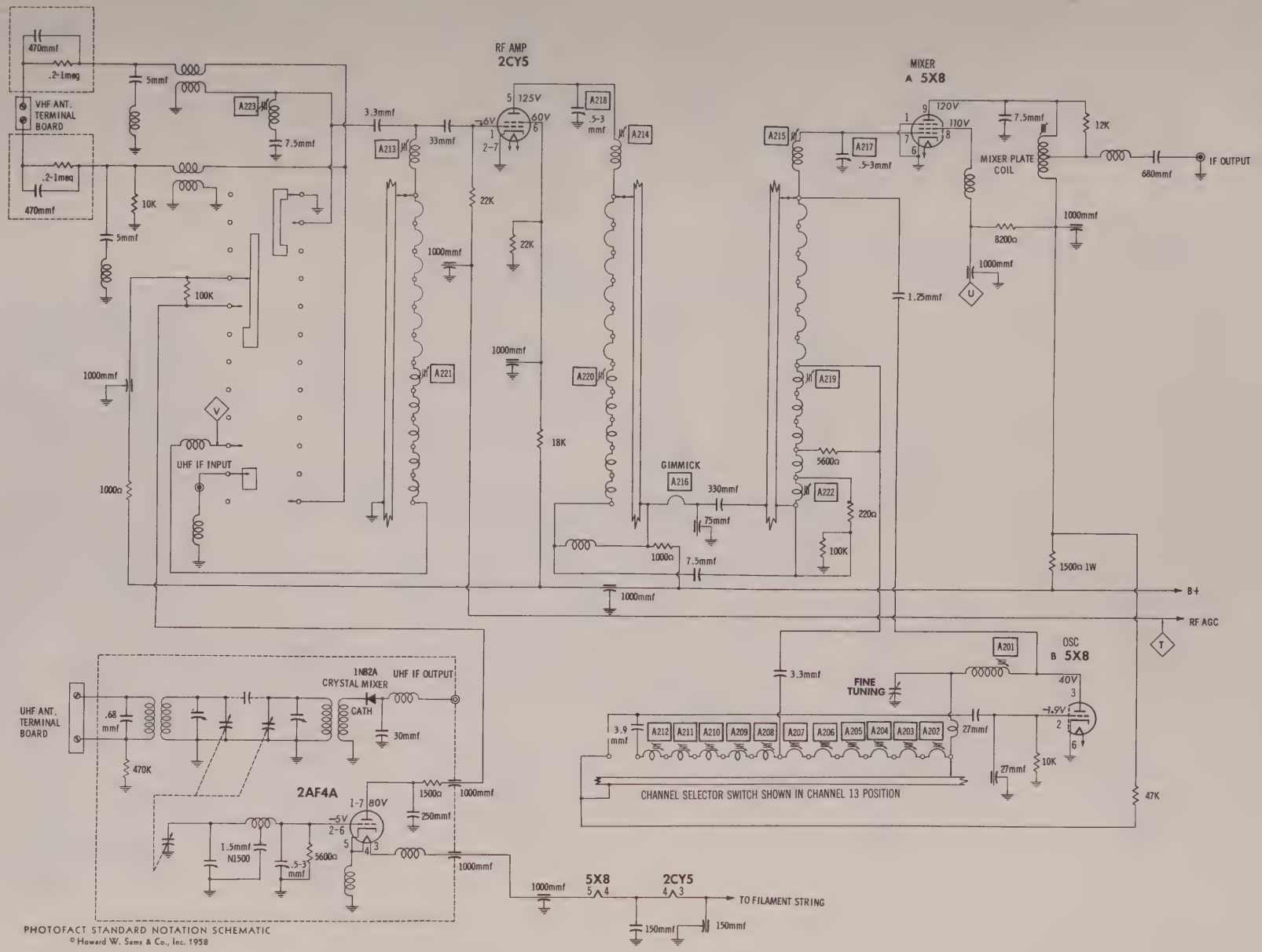
NAME	PART NO.	DESCRIPTION
Safety Glass	54-5312-2	Models F3202C, UF3202C
Safety Glass	54-5312-3	Models F3042F, G, F3044A, S, F3204L, UF3042F, G, UF3044A, S, UF3204L
Safety Glass	54-5311-3	Models F3204B, UF3204B
Safety Glass	54-5312-5	Models F3044WA, UF3044WA
Safety Glass	54-9213-73	Models F4221, L, UF4221, L, F4222, L, UF4222, L
Mask	54-6555-4	Models F4221, UF4221
Mask	54-6629-2	Models F4221L, UF4221L
Mask	54-6555-3	Models F4222, L, UF4222, L
Bezel	54-6643-1	UHF Models UF4221, L
Knob	54-6300-7	Brightness, Horiz. Hold, Vert. Hold, Models F3042F, G, UF3042F, G, F3044A, S, WA, UF3044A, F3202C, UF3202C, F3204B, L, UF3204B, L, UF3044WA
Knob	54-6265-39	Brightness, Horiz. Hold, Vert. Hold, Models F4221, L, UF4221, L
Knob	54-6265-38	Brightness, Horiz. Hold, Vert. Hold, Models F4222, L, UF4222, L
Knob	54-6261-20	Channel Selector, Models F3042F, G, F3044A, S, F3204B, L
Knob	54-6261-21	Channel Selector, Models UF3042F, G, UF3044A, S, UF3204B, L
Knob	54-6261-24	Channel Selector, Model F3202C
Knob	54-6261-25	Channel Selector, Model UF3202C
Knob	54-6261-30	Channel Selector, Model F3044WA
Knob	54-6261-31	Channel Selector, Model UF3044WA
Knob	54-6261-28	Channel Selector, Models F4221, L, F4222, L
Knob	54-6261-29	Channel Selector, Models UF4221, L, UF4222, L
Knob	54-6318-1	Contrast, Models F3042F, G, UF3042F, G, F3044A, S, WA, UF3044A, S, WA, F3202C, UF3202C, F3204B, L, UF3204B, L
Knob	54-6318-3	Contrast, Models F4221, L, UF4221, L, F4222, L, UF4222, L
Knob	54-6317-3	Fine Tuning, Models F3042F, G, UF3042F, G, F3044A, S, WA, UF3044A, S, WA, F3202C, UF3202C, F3204B, L, UF3204B, L
Knob	54-6317-5	Fine Tuning, Models F4221, L, UF4221, L, F4222, L, UF4222, L
Knob	76-10210-1	UHF Tuning, Models UF3204B, L, UF3042F, G, UF3044A, UF3202C, UF4222, L
Knob	76-10210-2	UHF Tuning, Models UF3044S, WA, UF4221, L
Knob	54-6263-3	Off-On-Volume, Models F3042F, G, UF3042F, G, F3044A, S, UF3044A, S, F3204B, UF3204B,
Knob	54-6263-5	Off-On-Volume, Models F3202C, UF3202C
Knob	54-6262-3	Off-On-Volume, Models F3204L, UF3204L
Knob	54-6263-7	Off-On-Volume, Models F3044WA, UF3044WA
Knob	54-6263-6	Off-On-Volume, Models F4221, L, UF4221, L, F4222, L, UF4222, L

WIRING DATA

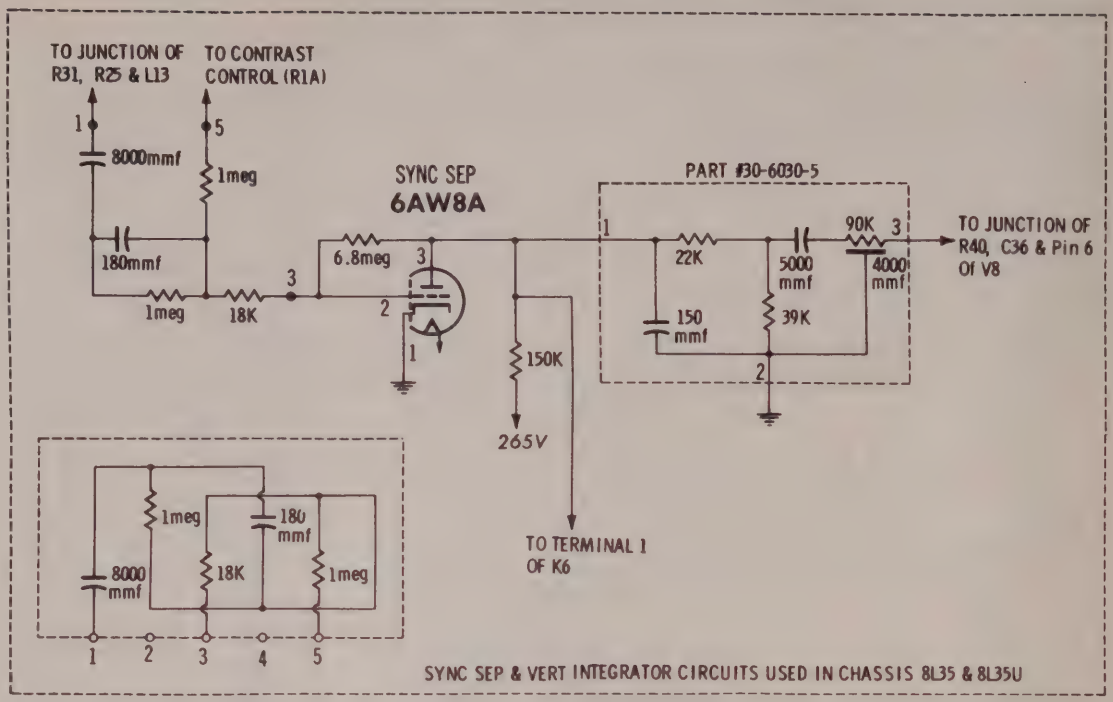
High Voltage Lead	Use BELDEN No. 8869
Shielded Hook-up Wire	Use BELDEN No. 8885 (Single Conductor) 8738 (Two Conductor)
General-use Unshielded Hook-up Wire	Use BELDEN No. 8530 (Solid) Available in Ten Colors 8524 (Stranded) Available in Ten Colors
Power Cord (Interlock Type)	Use BELDEN No. 8874
300Ω Tuner Input Lead	Use BELDEN No. 8225
300Ω Antenna Lead-in	Use BELDEN No. 8230 or 8275
Antenna Rotor Cable	Use BELDEN No. 8464 (Flat) or 8484 (Round) - 4 Conductor 8485 (Round) - 5 Conductor 8488 (Round) - 8 Conductor

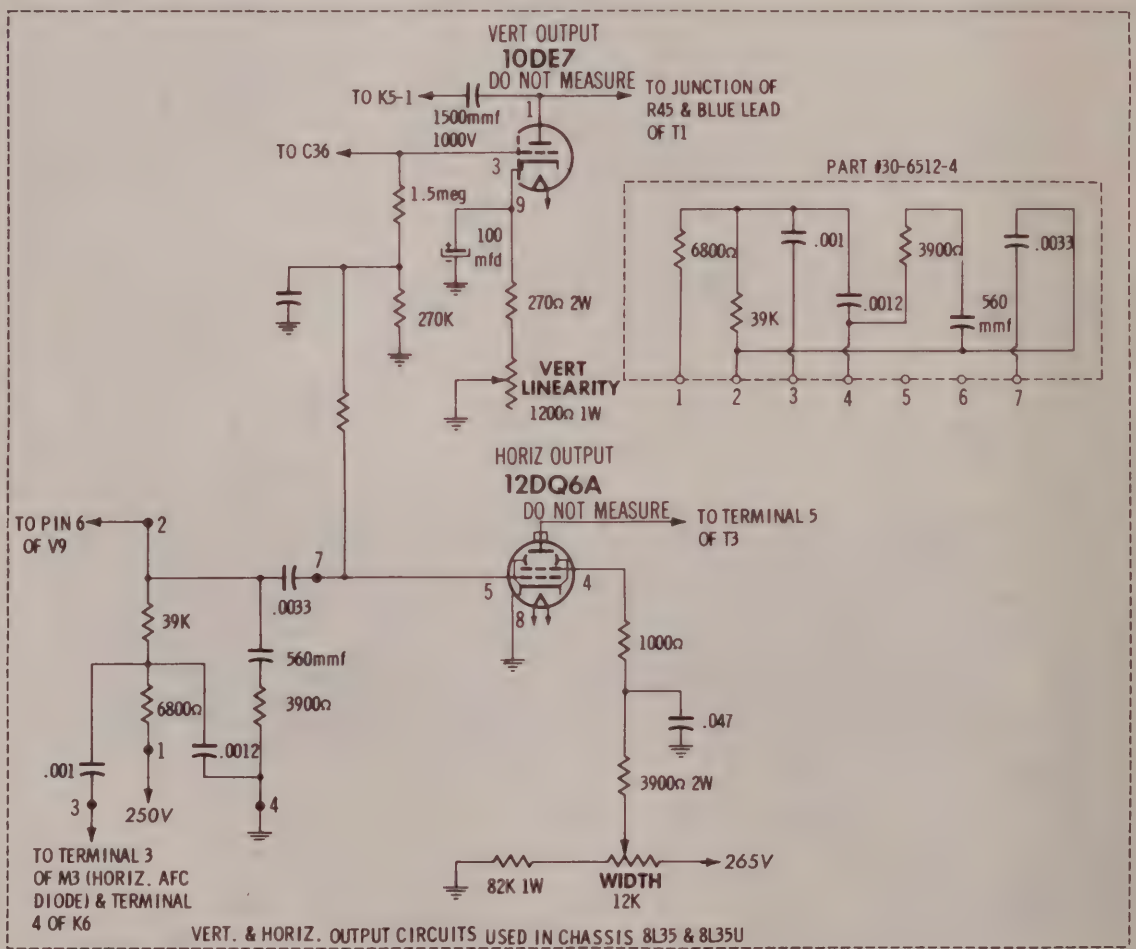


VIDEO IF PRINTED BOARD



TUNERS #76-10306-1 (T-27B) (UHF) & T-69F (VHF with UHF provisions)





A PHOTOFACT STANDARD NOTATION SCHEMATIC

Howard W. Sams & Co., Inc. 1958

ALTERNATE CIRCUITS USED IN CH. 8L35, U

TUNER PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V201	RF Amplifier	2CY5	

ITEM No.	USE	TYPE	NOTES
V202	Mixer-Osc.	5X8	

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING CAP.	RATING VOLT	REPLACEMENT DATA PHILCO PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C201	3.3		30-1224-149						N330 ±.25mmf
C202	7.5		30-1251-19						NPO ±.5mmf
C203	33		62-033409011		TCA-33				N330 10%
C204	1000		30-1268-7	EF-001	MFT-1000			503C-D1	
C205	.5-3		31-6520-1		829-3		CT565A		
C206	1000		30-1268-7	EF-001	MFT-1000			503C-D1	
C207	1000		30-1268-7	EF-001	MFT-1000			503C-D1	
C208	150		30-1268-6						
C209	75		30-1268-3						①
C210	330		30-1265-2	BPD-00033	DD-331	LI0T33	UC-5333	5GA-T33	
C211	.5-3		31-6535-3		829-3		CT565A		
C212	1.25		30-1224-147						NPO
C213	3.3		30-1224-140						N1500 ±.25mmf
C214	7.5		30-1251-19						NPO ±.5mmf
C215	680		30-1238-22	BPD-00068	DD-681	BYA10T68	UC-5368	5GA-T68	
C216	1000		30-1268-7	EF-001	MFT-1000			503C-D1	
C217	1000		30-1268-7	EF-001	MFT-1000			503C-D1	
C218	27		30-1268-4						N750 10%
C219	27		30-1224-146	NPO-SI 27	TCZ-27	CTA6Q1C			NPO 10%
C220			28-11835						
C221	1000		30-1268-7	EF-001	MFT-1000			503C-D1	

① Some versions may use 65mmf in this application.

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING OHMS	RATING WATT	PHILCO PART No.	NOTES
R201	10K		66-3108340	
R202	22 K		66-3228340	
R203	1000Ω		66-2108340	
R204	1000Ω		66-2108340	
R205	18K		66-3188340	
R206	22K		66-3228340	

ITEM No.	RATING OHMS	RATING WATT	PHILCO PART No.	NOTES
R207	100K		66-4108340	
R208	5600Ω		66-2568340	
R209	12K		66-3128340	
R210	8200Ω		66-2828340	
R211	10K		66-3108340	
R212	47K		66-3478340	

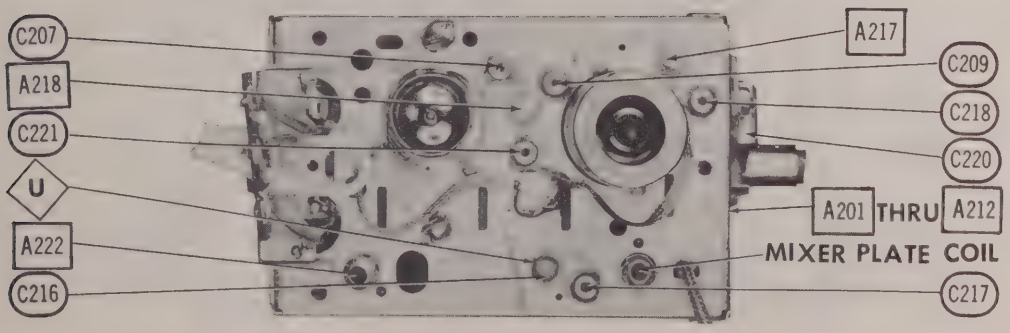
COILS (RF-IF)

ITEM No.	USE	PHILCO PART No.	NOTES
L201	Ant. Coil	32-4725	
L202	Ant. Coil	32-4725	
L203	IF Trap	32-4719-1	
L204	Ant. Coils	76-10268	Channel 2-13, Wafer & Switch Ass'y.
L205	RF Coils	76-10269	Channel 2-13, Wafer & Switch Ass'y.

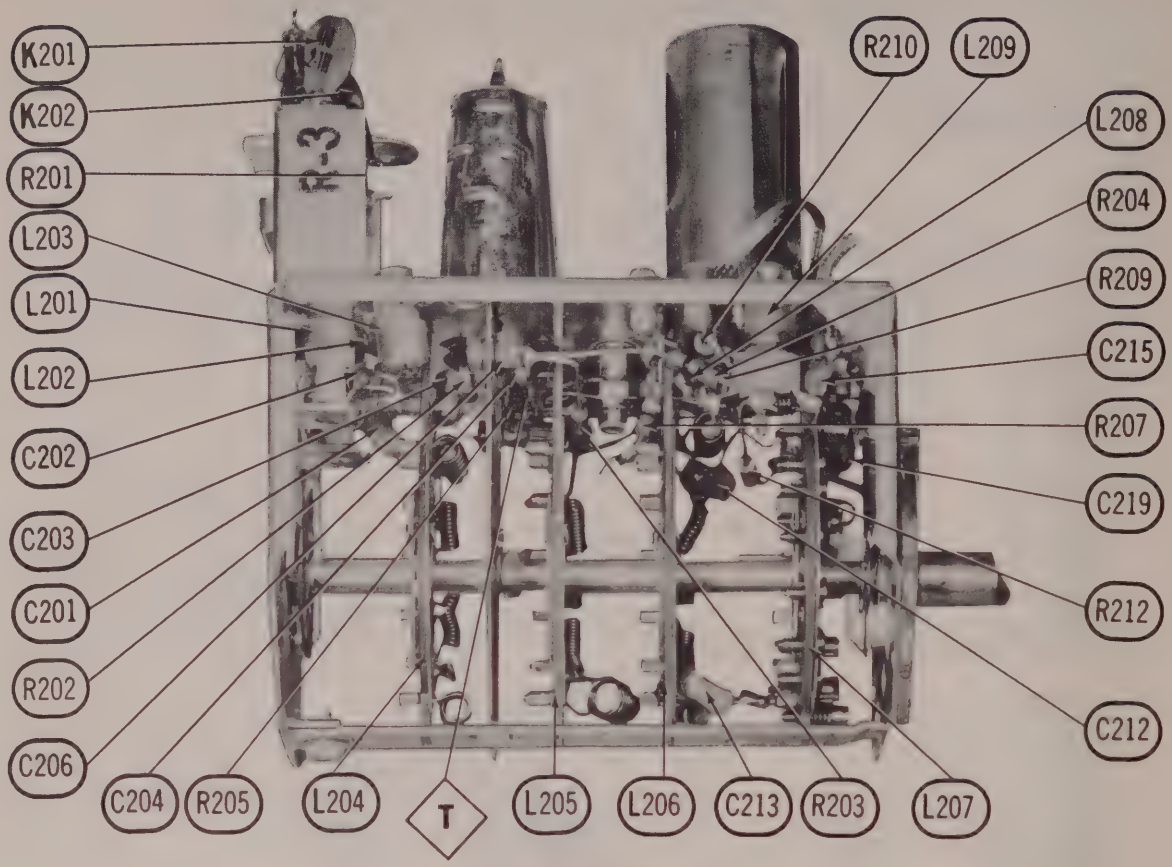
ITEM No.	USE	PHILCO PART No.	NOTES
L206	Mixer Grid Coils	76-10270	Channel 2-13, Wafer & Switch Ass'y.
L207	Osc. Coils	76-11500	Channel 2-13, Wafer & Switch Ass'y.
L208	RF Choke	32-4652-48	
L209	Mixer Plate Coil	32-4629-8	Includes RF Choke

COMPONENT COMBINATIONS

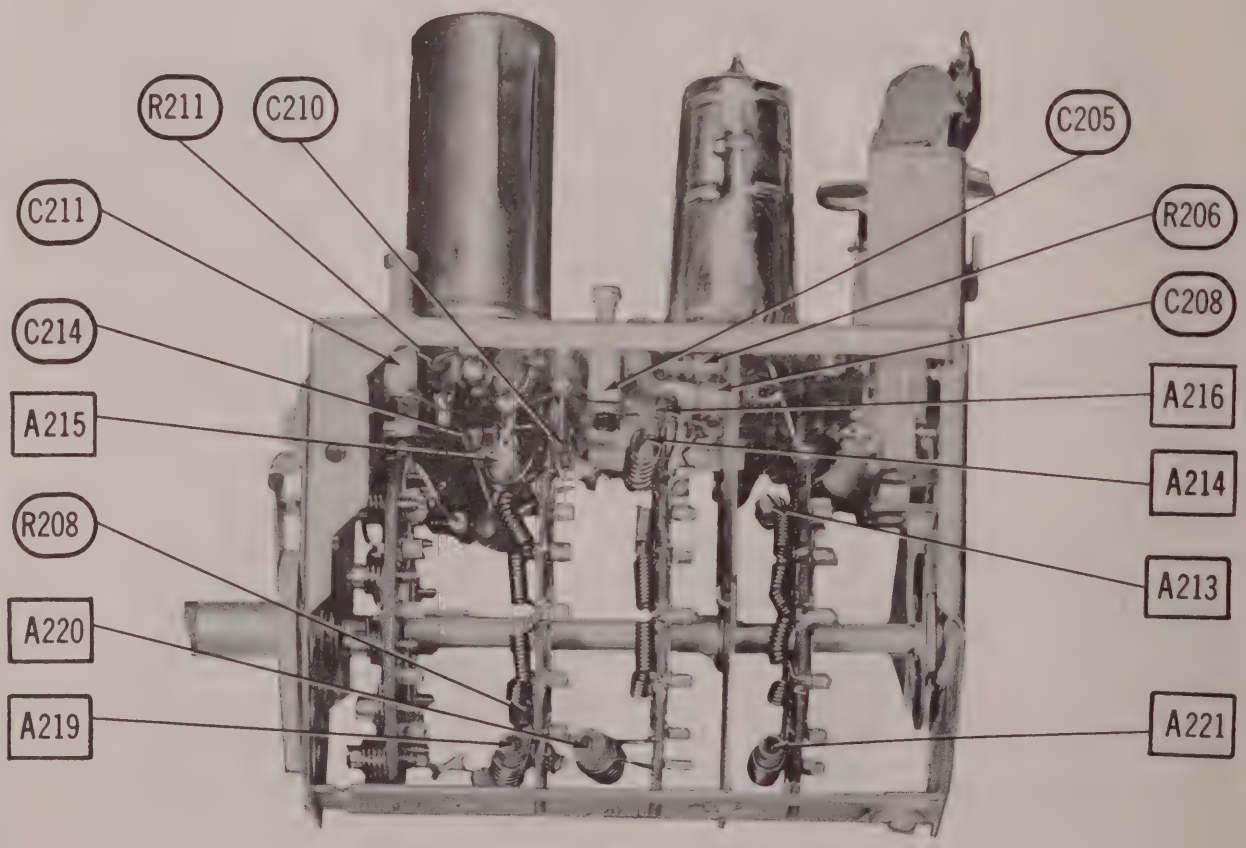
ITEM No.	USE	DESCRIPTION	PHILCO PART No.	REPLACEMENT DATA
K201	Antenna Coupling	470mmf, .2-1meg	30-6028-1	Centralab RC-471 Sprague R-9197
K202	Antenna Coupling	470mmf, .2-1meg	30-6028-1	Centralab RC-471 Sprague R-9197



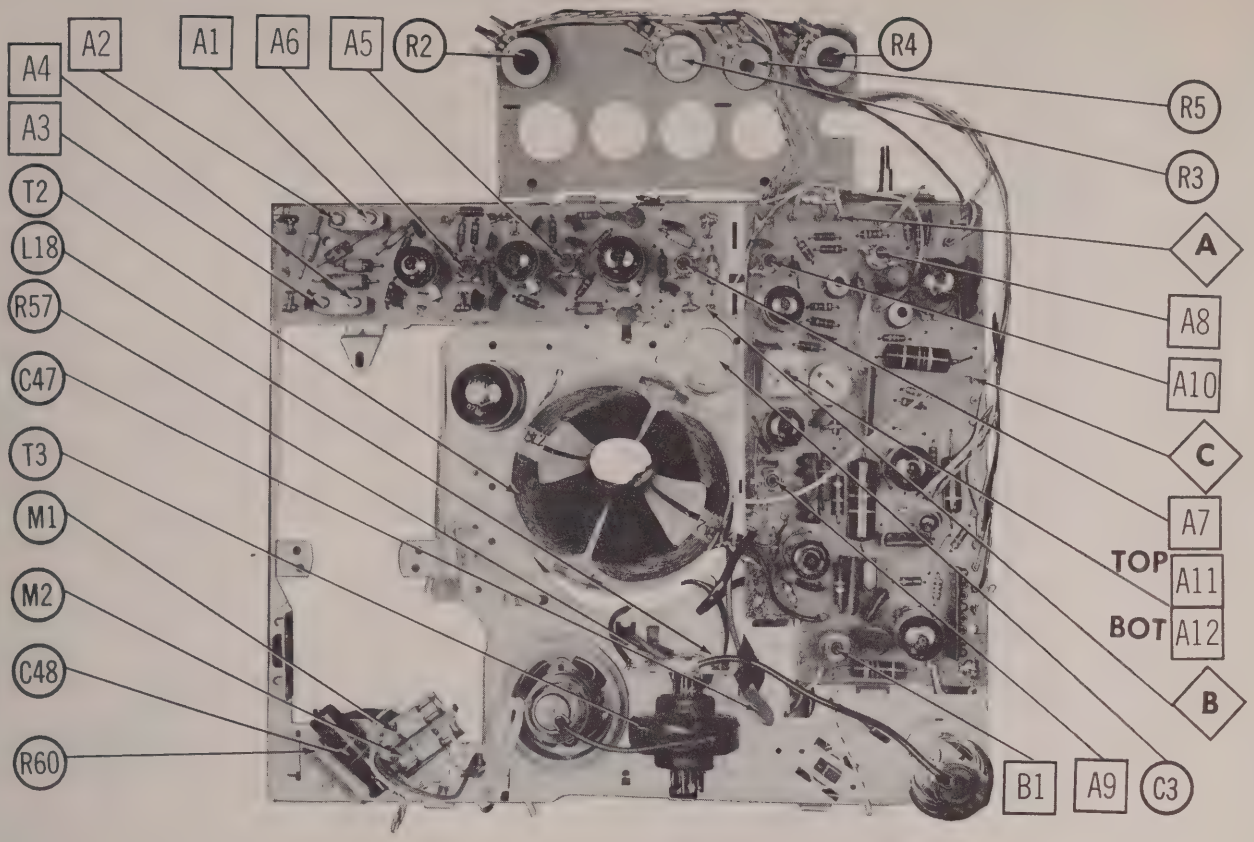
RF TUNER—TOP VIEW



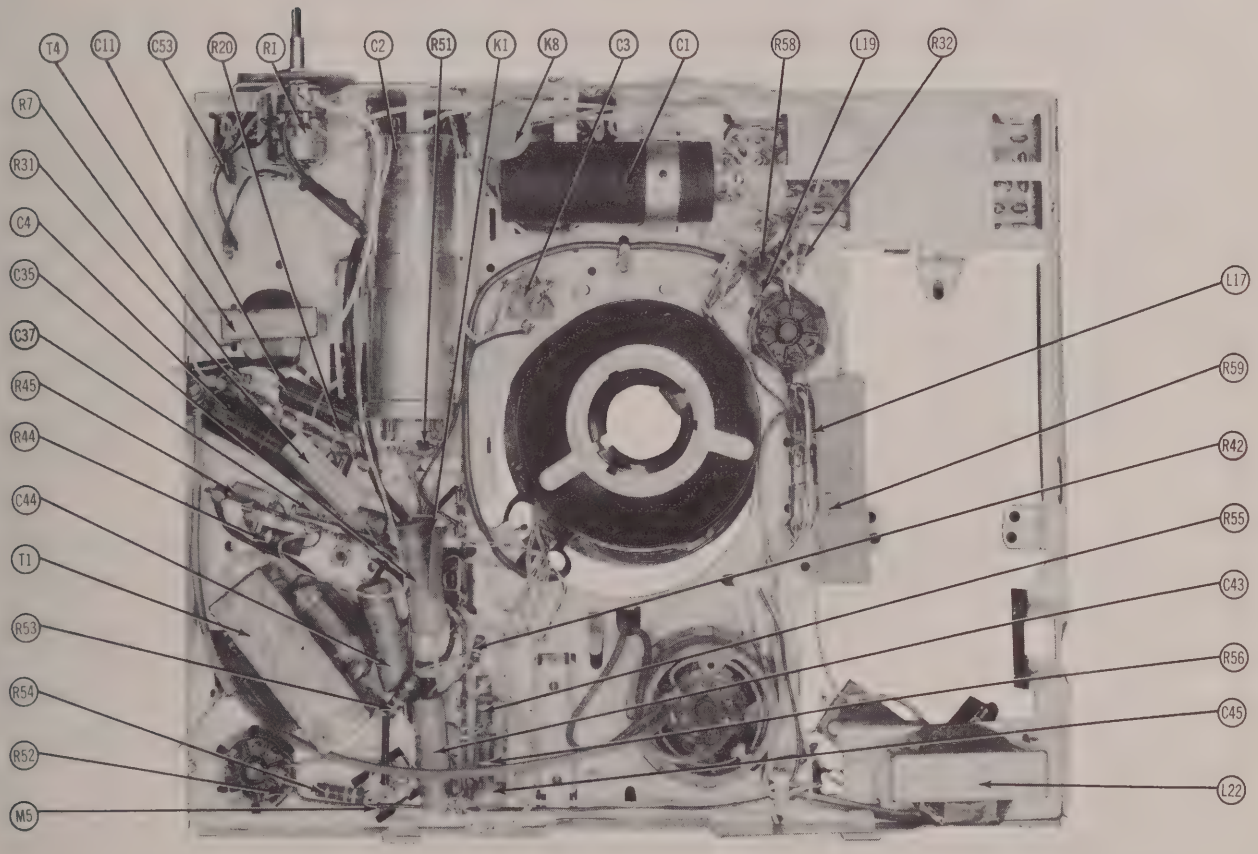
RF TUNER-LEFT SIDE



RF TUNER-RIGHT SIDE



CHASSIS TOP VIEW

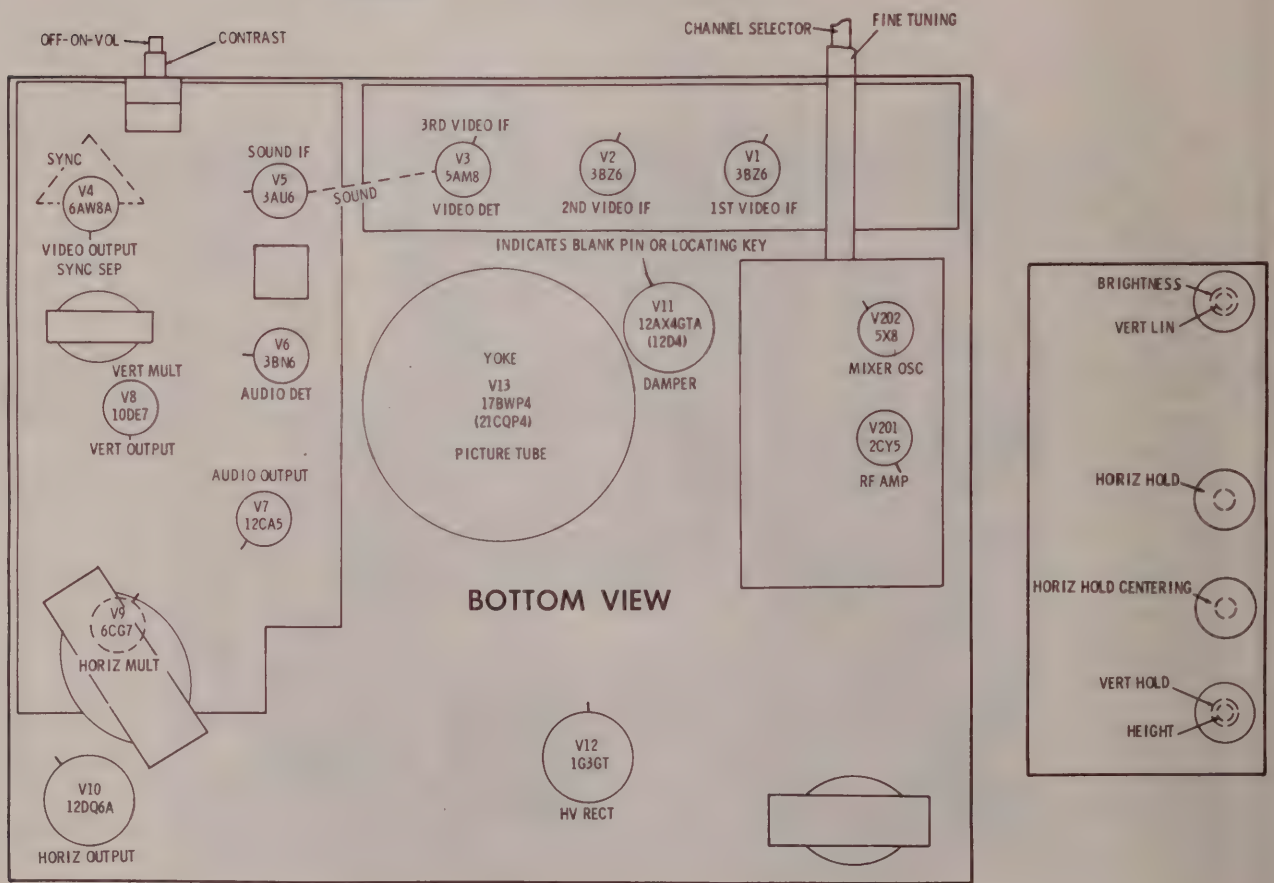


CHASSIS BOTTOM VIEW

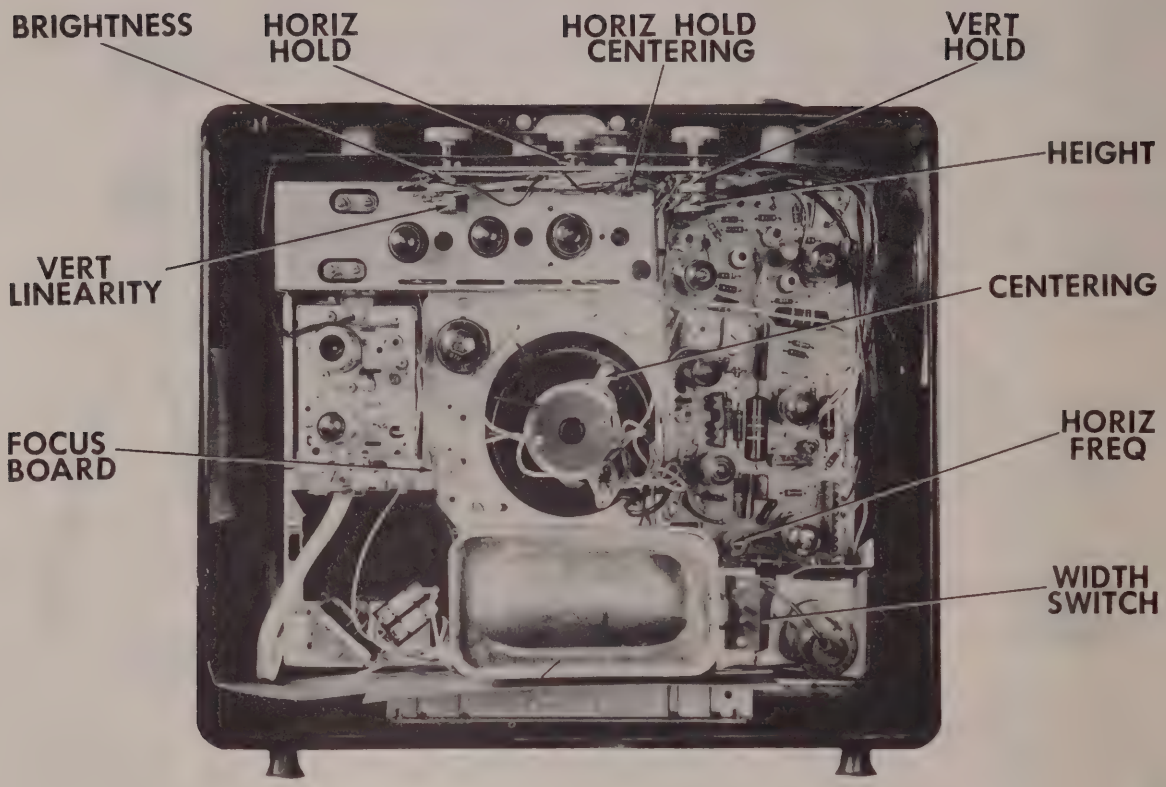
RESISTANCE MEASUREMENTS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	3BZ6	1.3meg	47Ω	12.5Ω	13.5Ω	††730Ω	††730Ω	0Ω		
V2	3BZ6	1.3meg	68Ω	13.5Ω	14.5Ω	††1400Ω	††1400Ω	0Ω		
V3	5AM8	220Ω	.2Ω	††1000Ω	14.5Ω	16Ω	††1000Ω	.2Ω	3900Ω	0Ω
V4	6AW8A	0Ω	850K	†50K	5Ω	6.5Ω	68Ω	680K	††0Ω	†5600Ω
V5	3AU6	4.3Ω	0Ω	6.5Ω	7.5Ω	††15K	††15K	180Ω		
V6	3BN6	•120Ω	3.5Ω	7.5Ω	8.5Ω	††3900Ω	4.8Ω	†470K		
V7	12CA5	¶20K	450K	8.5Ω	11Ω	450K	†0Ω	†295Ω		
V8	10DE7	†400Ω	1.8meg	1.8meg	3Ω	5Ω	•‡3meg	150K	•28K	•1200Ω
V9	6CG7	†17K	6meg	1000Ω	1.5Ω	3Ω	†51K	•70K	1000Ω	NC
V10	12DQ6A	NC	18Ω	TP	†6900Ω	1meg	NC	21Ω	0Ω	TOP CAP ‡13.8Ω
V11	12AX4GTA	TP	NC	¶170K	NC	†1.8Ω	NC	18Ω	16Ω	
V12	1G3GT	PINS 1 THRU 8 HAVE INFINITE RESISTANCE								TOP CAP ‡383Ω
V13	17BWP4	NC	•250K	12.5Ω	11Ω	1Meg	††0Ω	‡100K		
V201	2CY5	1.4meg	0Ω	1.5Ω	1Ω	††1000Ω	††13K	0Ω		
V202	5X8	0Ω	10K	††48K	0Ω	1Ω	0Ω	100K	††9200Ω	††1000Ω
ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9

¶ THIS READING WILL VARY DEPENDING UPON THE CONDITION OF THE ELECTROLYTIC CAPACITOR CONNECTED IN THE ASSOCIATED CIRCUIT.
• THIS READING WILL VARY. CONTROL SET FOR NORMAL OPERATION.
† MEASURED FROM 265V SOURCE.
‡ MEASURED FROM PIN 3 OF V11.
†† MEASURED FROM 130V SOURCE.
NC NO CONNECTION.
TP TIE POINT.



TUBE PLACEMENT CHART



CABINET—REAR VIEW

HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

Turn the set on and tune in a station signal. Allow the receiver to warm up. Connect a clip lead across the Horizontal Frequency Coil (L21).

Set the Horizontal Hold to the center of its range.

Adjust the Horizontal Hold Centering (R5) until picture appears to float back and forth across the screen.

Remove the clip lead from across L21 and adjust the Horizontal Frequency (B1) until the picture synchronizes horizontally.

PHOTOFACT* Folder
*TRADE MARK
EIA MEMBER ELECTRONIC INDUSTRIES ASSOCIATION

PRODUCTION CHANGE BULLETIN 214

PRODUCTION CHANGE BULLETIN 214

SUPPLEMENTAL DATA TO PHOTOFACT FOLDER 3 IN SET 388

WESTINGHOUSE CHASSIS V-2372-23, -27, -67, V-2382-202, -204, -602, -604

Westinghouse Models H-21K223, H-21K224, H-21K225, H-21K226, H-21K227, H-21K228, H-21K229, H-21K232, H-21K233, H-21KU223, A, H-21KU224, A, H-21KU225, A, H-21KU226, A, H-21KU227, A, H-21KU228, A, H-21KU229, A, H-21KU232, A, H-21KU233, A, H-21T218, A, H-21T219, A, H-21T220, A, H-21T221, A, H-21T222, A, H-21T223, H-21T224, H-21T225, H-21TU218, A, B, C, H-21TU219, A, B, C, H-21TU220, A, B, C, H-21TU221, A, B, C, H-21TU222, A, B, C, H-21TU223, H-21TU224 and H-21TU225 (Ch. V-2372-27, -67, V-2382-202, -204, -602, -604) were covered in Photofact Folder 3 - Set 388.

Models H-21T219B, H-21T221B, H-21T222B and H-21K226B (Ch. V-2372-23) are added, along with late production changes, with the publication of this bulletin.

COMPONENT CHANGES

R20 is increased from 100Ω to 330Ω.

C48 is omitted.

A 4mfd @ 300V electrolytic capacitor is added from pin 8 of V7A, audio output, to ground.

R36 is removed and replaced by direct wiring.

R35 is omitted and is replaced by direct wiring.

R34 is increased from 3300Ω to 3900Ω 5%.

R103 is omitted.

R46 is increased from 1000Ω to 10meg. With this change, R46 is wired in parallel with C52. C52 is now wired to ground.

An 18K 2W resistor is added from pin 8 of V7A, video output, to the 265V source.

L16, 4th. Video IF Assembly, is changed to Part #235V005H02.

L11, 47.25MC Trap, is changed to Part #230V058H01.

C2C is removed and replaced with a .01mfd @ 600V capacitor.

R96 is increased from 8200Ω to 10K.

R100 is increased from 560Ω to 1000Ω.

R65 is increased in wattage from 4 watts to 7 watts.

Chassis V-2372-23

NEW VHF TUNER

Models using Ch. V-2372-23 use VHF Tuner #470V043H03. A schematic showing the new VHF tuner is given on the reverse side.

(Continued on Reverse Side)

SUPPLEMENTAL DATA TO PHOTOFACT FOLDER 8 IN SET 378

GROMMES MODEL LJ-6

Grommes Model LJ-5 was covered in Photofact Folder 8 - Set 378.

Model LJ-6 is electrically identical to the model covered, except for the following change.

LV RECTIFIER CIRCUIT CHANGED

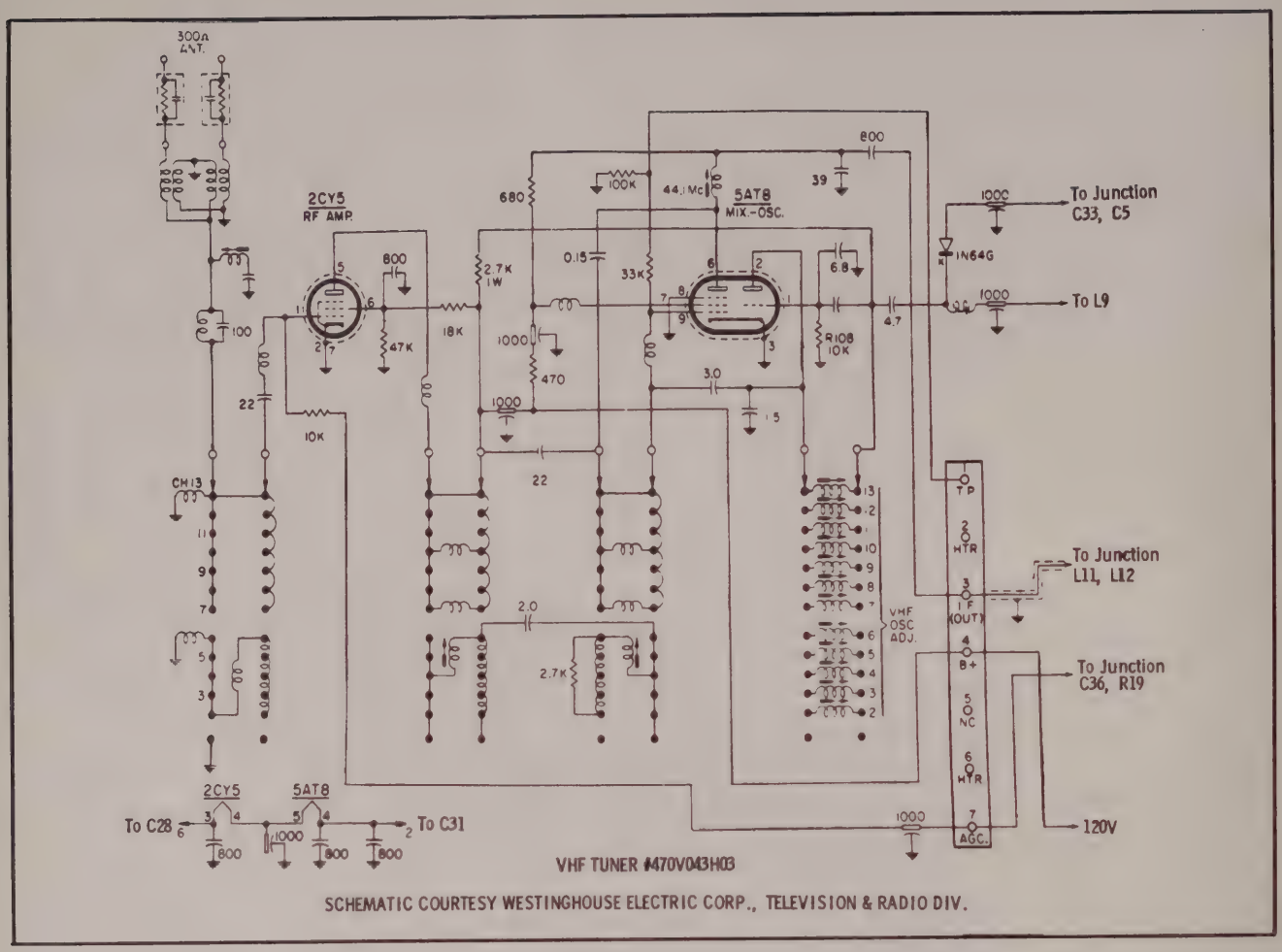
The low voltage power supply circuit is changed. V5 is changed from 5Y3GT to 6X5GT. A partial schematic showing the new circuit is given on the reverse side.

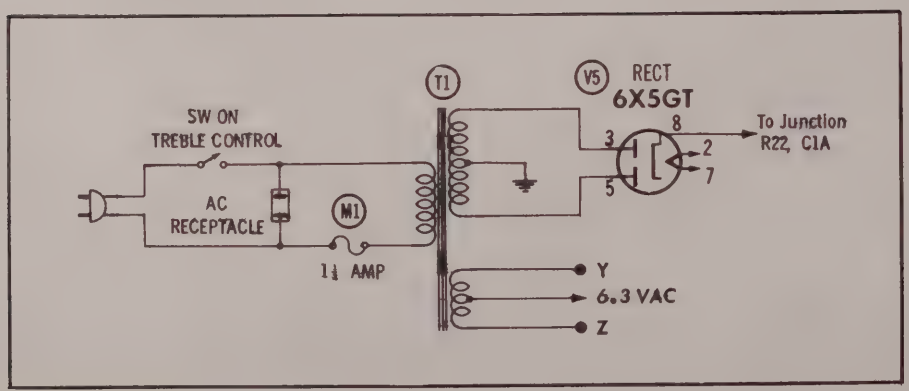
COMPONENT CHANGE

T1, Power Transformer, is changed to Part #TP-9.

HOWARD W. SAMS & CO., INC. • Indianapolis 5, Indiana

The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed. Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. © 1958 Howard W. Sams & Co., Inc., Indianapolis 5, Indiana. Printed in U.S. of America


300Ω ANT.
2CY5 RF AMP.
5AT8 MIX.-OSC.
44.1 Mc
680
100K
800
39
1000
To Junction C33, C5
1N64G
To L9
2.7K 1W
0.15
33K
6.8
R108 10K
4.7
3.0
1.5
18K
47K
1000
470
22
10K
CH13
2.0
2.7K
VHF OSC ADJ.
TP
HTR
IF (OUT)
B+
NC
AGC.
To Junction L11, L12
To Junction C36, R19
120V
To C28
To C31
VHF TUNER #470V043H03
SCHEMATIC COURTESY WESTINGHOUSE ELECTRIC CORP., TELEVISION & RADIO DIV.


T1
V5 RECT 6X5GT
SW ON TREBLE CONTROL
AC RECEPTACLE
M1
1¼ AMP
To Junction R22, C1A
Y
6.3 VAC
Z

SUPPLEMENTAL DATA TO PHOTOFACT FOLDER 3 IN SET 379

Sylvania Models 17P101, J, 17P102, 17P103, 17P201 (Ch. 1-537-1, -3, -4) were covered in Photofact Folder 3 - Set 379.

Models 17P104, 17P105, 17P202 (Ch. 1-537-1, -3, -4) are added along with late production changes, with the publication of this bulletin.

COMPONENT CHANGES

R84 is changed to 4.7Ω 15W wire wound, Part #187-0034.

A 2Amp Ⓐ 125V slow blow fuse is added between the on-off switch and R84.

R5, Vertical Linearity, is changed to 1meg with 300K stop, Part #153-0137.

R6, Vertical Hold, is increased from 1meg to 2meg, Part #153-0139.

A rewired picture tube cable and socket is used in later production, Part #417-0037. The spliced black lead at pin 7 of the picture tube socket is replaced with a blue lead and eliminates the blue lead at pin 6. A metal focus jumper is added from pin 6 to pin 5 or pin 6 to pin 7 whichever gives best focus.

K5, Audio Couplate, is changed to Part #190-0039.

R75 is increased from 2200Ω to 6800Ω.

R3, Brightness and Switch, is changed to Part #152-0051.

SYNC SEP CIRCUIT CHANGES

The following changes are made in sets using 3CS6 tubes marked with a yellow dot. These tubes are NOT interchangeable with unmarked tubes and must NOT be used in other circuit variations.

R55 is increased from 27K to 33K.

A 10K resistor is added between R4, AGC, and 225V source.

K6, Sync Sep. Couplate, is changed to Part #190-0043.

A 10K resistor is added in parallel with C62.

R56 is increased in wattage from 1 watt to 2 watt.

SYLVANIA MODELS 17P101, J, 17P102, 17P103, 17P104, 17P105, 17P201, 17P202 (Ch. 1-537-1, -3, -4)

SUPPLEMENTAL DATA TO PHOTOFACT FOLDER 10 IN SET 375

Grommes Model 221 was covered in Photofact Folder 10 - Set 375.

Model 221A is electrically identical to the model covered, except for the following changes.

COMPONENT CHANGES

C4 is increased from .22mfd to .47mfd.

R4 is decreased from 22K to 10K.

C6 is increased from .22mfd to .47mfd.

R20 is decreased from 22K 2W to 4700Ω 1W.

L1, Filter Choke, is omitted, and replaced with direct wiring.

T2, Audio Output Transformer, is changed to Part #TO-22A.

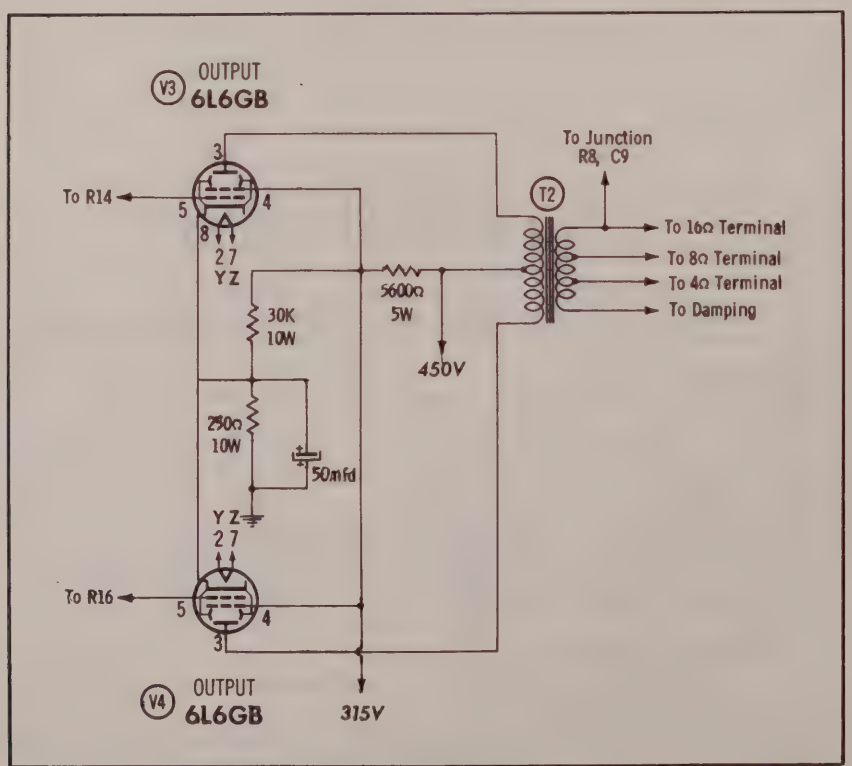
R8 is increased from 22K to 27K.

AUDIO OUTPUT CIRCUIT REVISED

The Audio Output circuit has been revised. A partial schematic showing the new circuit is given on the reverse side.

GROMMES MODEL 221A

(Continued on Reverse Side)


V3 OUTPUT
6L6GB
To Junction
R8, C9
T2
To R14
To 16Ω Terminal
To 8Ω Terminal
To 4Ω Terminal
To Damping
5600Ω
5W
30K
10W
450V
250Ω
10W
50mfd
To R16
V4 OUTPUT
6L6GB
315V

PHOTOFACT* Folder

EIA MEMBER ELECTRONIC INDUSTRIES ASSOCIATION

ADMIRAL MODELS 341, 347, 362, 363, 364, 372, 373, (Ch. 4T2)

ADMIRAL MODELS 341,
347, 362, 363, 364, 372, 373, (Ch. 4T2)

MODEL 341

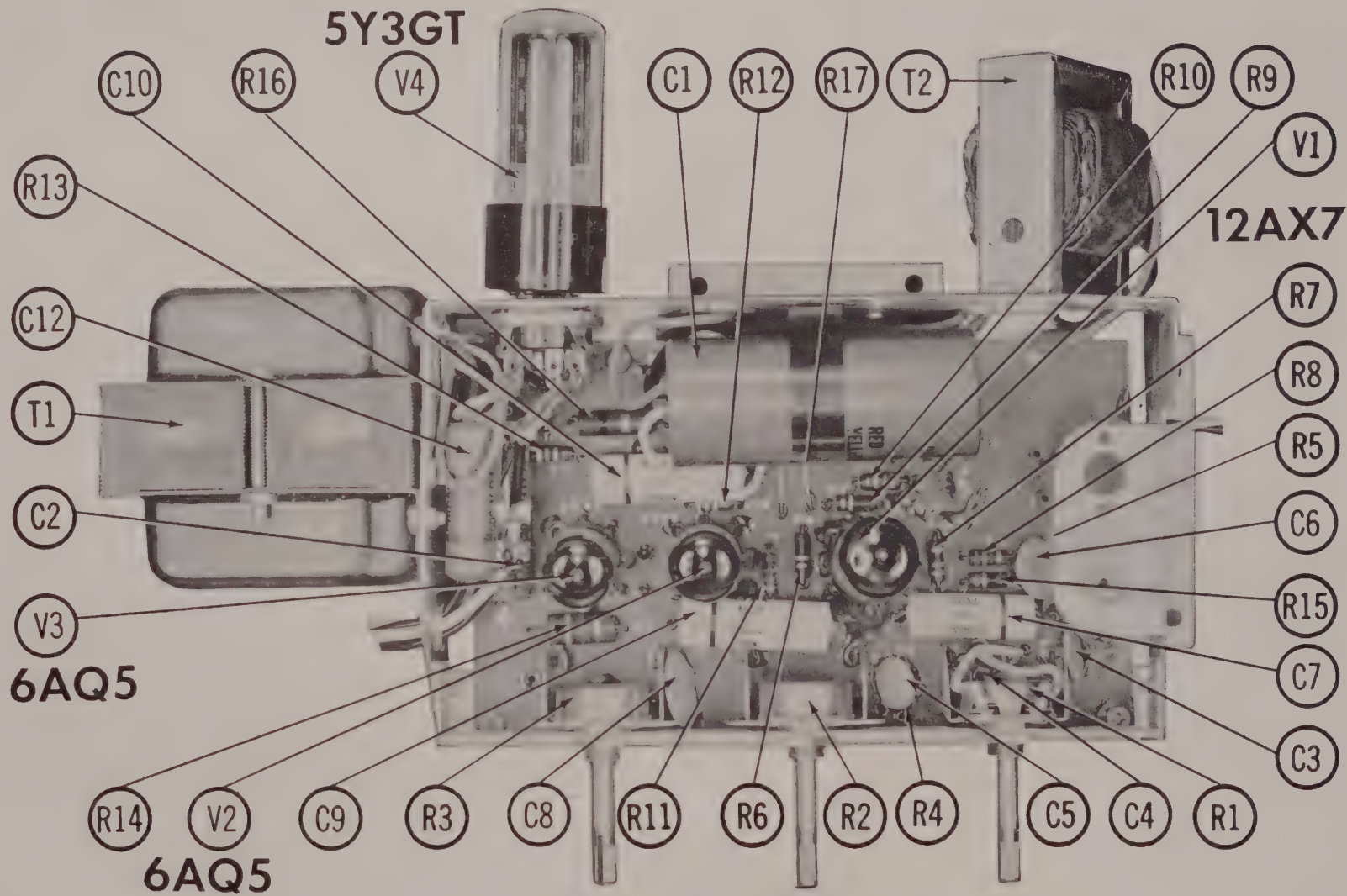
ADMIRAL MODELS 341,
347, 362, 363, 364, 372, 373, (Ch. 4T2)

TRADE NAME	Admiral Models 341, 347, 362, 363, 364, 372, 373 (Ch. 4T2)
MANUFACTURER	Admiral Corp., 3800 W. Cortland St., Chicago 47, Illinois
TYPE SET	AC Operated Phono Amplifier With 4 Speed Automatic Record Changer
TUBES (Four)	Types 12AX7 AF Amp.-Phase Inv., (2) 6AQ5 Output, 5Y3GT Rectifier
POWER SUPPLY	110-120 Volts AC-60 Cycle RATING .46 Amp. @ 117 Volts AC (47 Watts Less Motor)

RECORD CHANGER - ADMIRAL MODEL RC637-1E or RC637-6E

HOWARD W. SAMS & CO., INC. • Indianapolis 5, Indiana

The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed. Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. © 1958 Howard W. Sams & Co., Inc., Indianapolis 5, Indiana. Printed in U.S. of America



CHASSIS TOP VIEW

PARTS LIST AND DESCRIPTIONS
TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V1	AF Amp.-Phase Inv.	12AX7	
V2	Output	6AQ5	
V3	Output	6AQ5	
V4	Rectifier	5Y3GT	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING CAP.	RATING VOLT.	ADMIRAL PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1A	70	300	67B23-6	PR3-030	BBRQ0926.5			T-122	R2660 *
B	50	300							
C	30	250							
C2	50	25	67A4-31	PRS25V50	BBR50-25	TC29	TD-50-25	MT-0250	TVA-1206

* Non-catalog item.

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING CAP.	RATING VOLT	ADMIRAL PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C3	35		65D10-78						N220
C4	75		65D10-79	N750-DI 75	DTN-75	C10T75U	NT-5475	5TCU-Q75	N750
C5	1500		65D10-103	BPD-0015	DD-152	BYA10D15	DC5215	5HK-D15	
C6	5000		65D10-152	BPD-005	DD-502	BYA10D5	DC525	5HK-D5	
C7	.022	200	64C24-61						10%
C8	4700		65D10-153			1R5D47		MS-247	10%
C9	.047	400	64C24-34	P488N-047	DF-503	CUB4S47	GEM-4147	4TM-S47	
C10	.047	600	64C24-34	P688N-047	DF-503	CUB6S47	GEM-6147	6TM-S47	
C11	4	10	64B13-1						10%
C12	.047	600	64C24-9	P688N-047	DF-503	CUB6S47	GEM-6147	6TM-S47	

CONTROLS

ITEM No.	RATING RESISTANCE	RATING WATTS	ADMIRAL PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
R1	3meg	½	75B39-1				U57	Loudness, Taps @ 500K & 1meg
R2A	3meg	½	75C25-11	B-84	A47-3meg-S	Q11-140	U59	Bass
B	Shaft			Not Req.	KSS-3	Not Req.	Not Req.	
R3A	1meg	½	75C25-10	B-70	A47-1meg-Z	Q13-137	U53	Treble
B	Shaft			Not Req.	KSS-3	Not Req.	Not Req.	

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING OHMS	RATING WATT	ADMIRAL PART No.	NOTES
R4	100K		60B8-104	
R5	33K		60B8-333	
R6	220K		60B8-224	
R7	3.3meg		60B8-335	
R8	680Ω		60B8-681	
R9	220K		60B8-224	
R10	33K 5%		60B7-333	
R11	6800Ω		60B8-682	
R12	470K 5%		60B7-474	
R13	470K 5%		60B7-474	
R14	270Ω	2	60B20-271	
R15	10K		60B8-103	
R16	100Ω	1	60B14-101	
R17	10K		60B8-103	

TRANSFORMER (POWER)

ITEM No.	RATING PRI.	RATING SEC. 1	RATING SEC. 2	RATING SEC. 3	RATING SEC. 4	RATING SEC. 5	ADMIRAL PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T1	117V @.46A	500VCT @.060A	5V @1.89A	6.3VCT @1.2A			80B60-1	P9202	P-3149	PC8402			R-6A

PARTS LIST AND DESCRIPTIONS (Continued)
TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE PRI.	IMPEDANCE SEC.	ADMIRAL PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	NOTES
T2	5000Ω CT	3-4Ω	79C56-6	Z1402	A-2904	AU-604	A-3823	26S46	S-55Z	

SPEAKER

ITEM No.	TYPE SIZE	TYPE FIELD	TYPE V. C. IMP.	ADMIRAL PART No.	QUAM PART No.	NOTES
SP1	8"	PM	3-4Ω	78B92-5 ①	8A31	① Used in Models 341, 347, 362, 363, 364
SP2	3½"	PM	3-4Ω	78B91-1 ②	3A15TZ3.2	② Used in all Models
	4"	PM	6-8Ω	78B84-6 ③		③ Used in Models 362, 363, 364
	12"	PM	3-4Ω	78B112-1 ④		④ Used in Models 372, 373

PHONO CARTRIDGE

ITEM No.	ADMIRAL PART No.	ASTATIC PART No. CARTRIDGE	ASTATIC PART No. NEEDLE	ELECTRO-VOICE PART No. CARTRIDGE	ELECTRO-VOICE PART No. MOUNT	REMARKS
M1	409B24	55-T or 81-TB	GD-J	56	PT-2	

ASTATIC NEEDLE LISTING SHOWN ABOVE IS SPECIFIED FOR THE RESPECTIVE REPLACEMENT CARTRIDGE LISTED. FOR ORIGINAL CARTRIDGE NEEDLE REPLACEMENTS SEE BELOW.

PHONO NEEDLE

(FOR REPLACEMENT IN ORIGINAL EQUIPMENT CARTRIDGE)

ITEM No.	ADMIRAL PART No.	JENSEN PART No.	WALCO PART No.	REMARKS
M2	98C15-67	†S-66 or †♦ S-66SD or ♦ S-66D	†W-75TPS or †♦W-75DS or ♦W-75TPD	† Jewel ♦ Diamond

MISCELLANEOUS

ITEM No.	PART NAME	ADMIRAL PART No.	NOTES
	Printed Board	14E217	

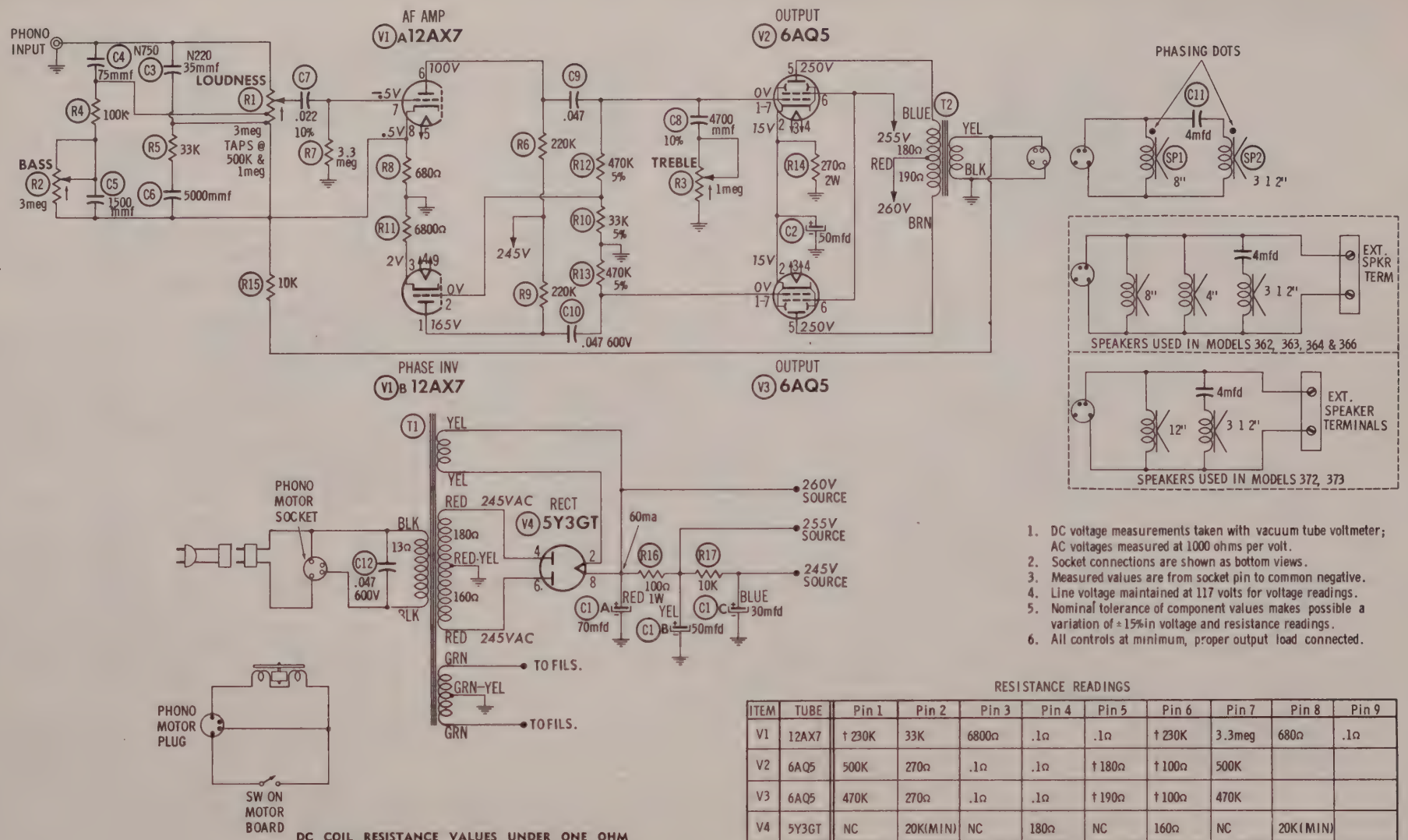
CABINETS & CABINET PARTS

(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

NAME	PART NO.	DESCRIPTION
Knob	33C81-6	3 Used, Model 341
Knob	33C81-11	3 Used, Models 347, 362, 363, 364, 372, 373
Cabinet	35E407-2	Mahogany, Model 362
Cabinet	35E409-1	Black and Gold, Complete, Model 341
Cabinet	35E407-3	Blond, Model 363
Cabinet	35E409-2	Tan and White, Complete, Model 347
Cabinet	35E407-4	Sierra, Model 364
Cabinet	35E411-2	Mahogany, Model 372
Cabinet	35E411-3	Blond, Model 373
Handle	35E409-51	Model 341
Handle	35E409-56	Model 347
Leg	37B132-6	Brass 16" Models 362, 363, 364
Leg	37B132-4	Cabinet Models 372, 373

WIRING DATA

General-use Unshielded Hook-up Wire	Use BELDEN No. 8530 (Solid) Available in Ten Colors 8524 (Stranded) Available in Ten Colors
Power Cord	Use BELDEN No. 1765-B (6 Ft. Length) 1725-K (7½ Ft. Length)
Low-Loss Shielded Lead (Interconnecting)	Use BELDEN No. 8401
Phono Pick-up Arm Cable	Use BELDEN No. 8430 (Two Conductor - Twisted)



1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance of component values makes possible a variation of ±15% in voltage and resistance readings.
6. All controls at minimum, proper output load connected.

RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	12AX7	†230K	33K	6800Ω	.1Ω	.1Ω	†230K	3.3meg	680Ω	.1Ω
V2	6AQ5	500K	270Ω	.1Ω	.1Ω	†180Ω	†100Ω	500K		
V3	6AQ5	470K	270Ω	.1Ω	.1Ω	†190Ω	†100Ω	470K		
V4	5Y3GT	NC	20K(MIN)	NC	180Ω	NC	160Ω	NC	20K(MIN)	

† MEASURED FROM PIN 8 OF V4.
NC NO CONNECTION.

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM

ARROWS ON CONTROLS INDICATE CLOCKWISE ROTATION (CONTROL VIEWED FROM SHAFT END)

A PHOTOFACT STANDARD NOTATION SCHEMATIC

© Howard W. Sams & Co., Inc. 1958

PHOTOFACT* Folder

EIA MEMBER ELECTRONIC INDUSTRIES ASSOCIATION

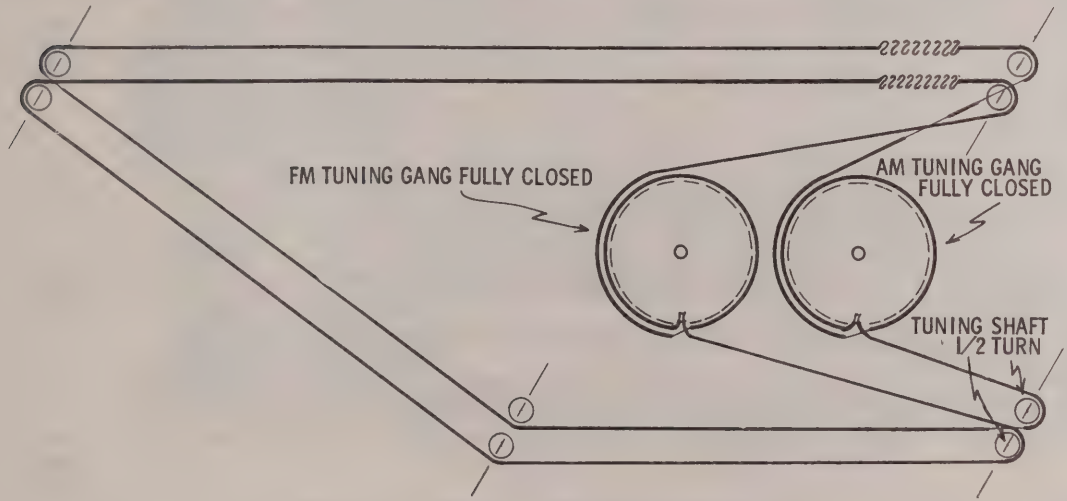
BRAUN MODEL MM4D, LO, W (Ch. RC-62)

BRAUN MODEL MM4D, LO, W (Ch. RC-62)

MODEL MM4D

TRADE NAME	Braun Models MM4D, MM4LO, MM4W (Ch. RC-62)
SUPPLIER	Electronic Utilities Corp., 153 W. Huron St., Chicago 10, Illinois
TYPE SET	AC Operated FM-BC-SW Receiver With 4 Speed Automatic Record Changer
TUBES (Nine)	Types 6AQ8/ECC85 FM RF Amp.-FM Conv., 6DA6/EF89 1st FM IF Amplifier, 6AJ8/ECH81 2nd FM IF Amp.-AM Mixer-AM Osc., 6DA6/EF89 3rd FM-1st AM IF Amp., 6T8/EABC80 Ratio Det.-AM Det.-AVC-AF Amp., 6BR5/EM80 Tuning Indicator, 6AB4/EC92 Phase Inverter, (2) EL95 Output
POWER SUPPLY	110/125/150/220/240 Volts AC-60 Cycles — RATING .52 Amp. @ 117 Volts AC (51 Watts)
TUNING RANGES -	BROADCAST 535-1620KC — SHORT WAVE I 12-23MC FREQ. MOD. 87-108MC — SHORT WAVE II 6-12.5MC

FOR SERVICE INFORMATION ON RECORD CHANGER - SEE SIMILAR TELEFUNKEN MODEL TW560 - PHOTOFACT SET 371 FOLDER 12 OR RECORD CHANGER MANUAL RC-10



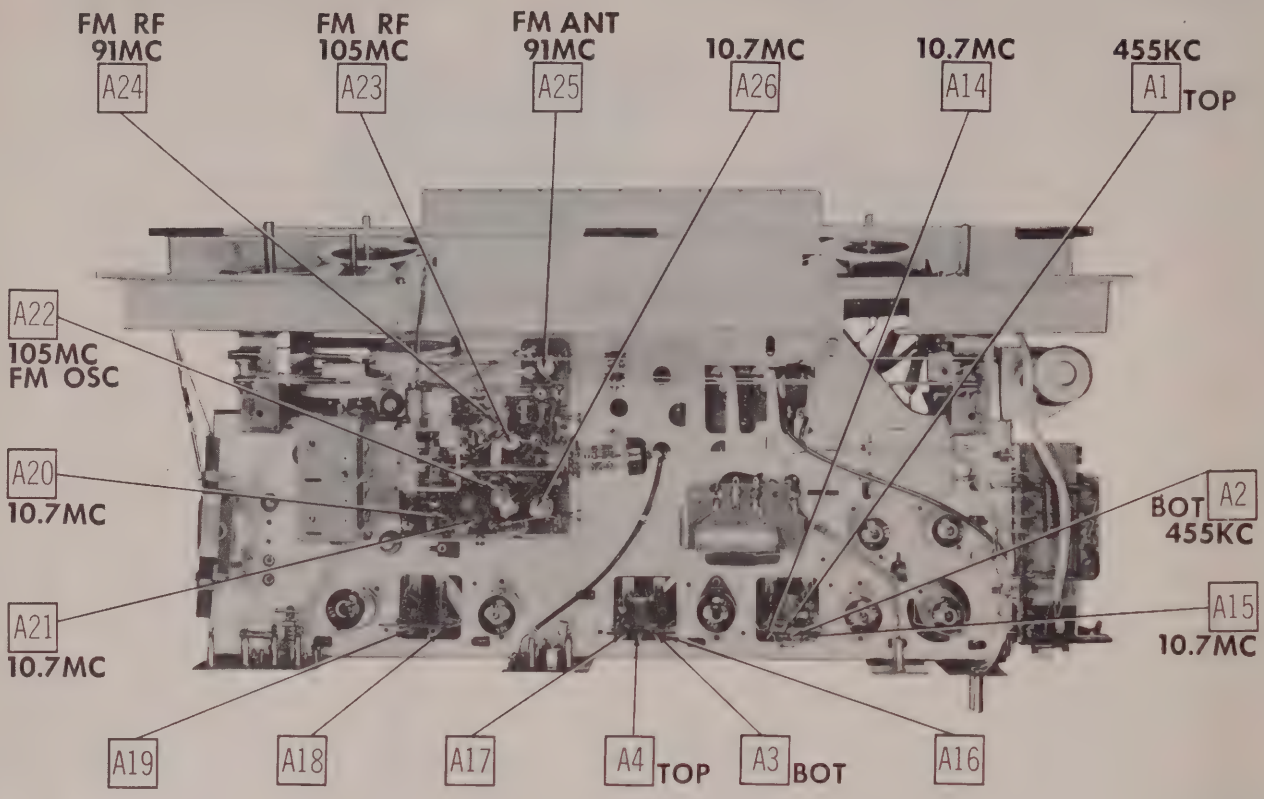
DIAL CORD STRINGING

HOWARD W. SAMS & CO., INC. • Indianapolis 5, Indiana

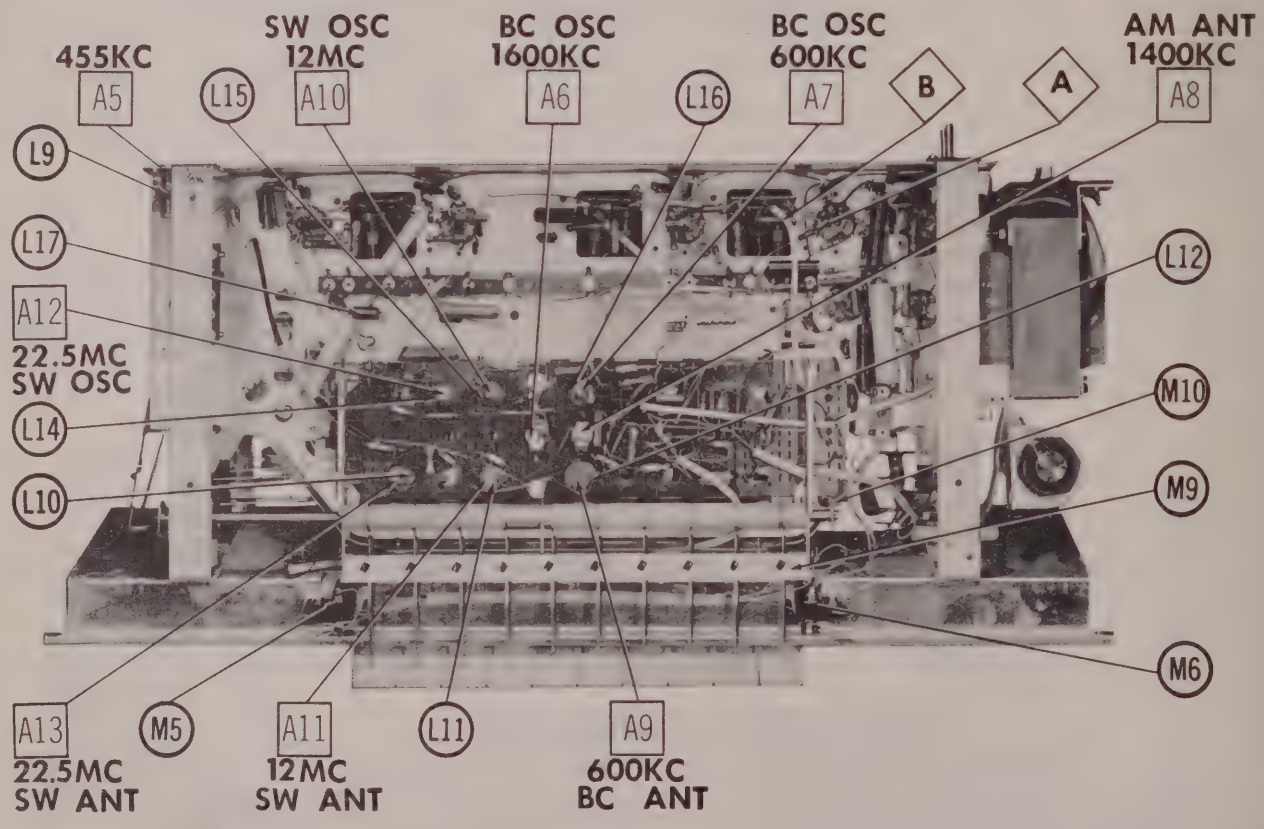
The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed. Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. © 1958 Howard W. Sams & Co., Inc., Indianapolis 5, Indiana. Printed in U.S. of America

H617

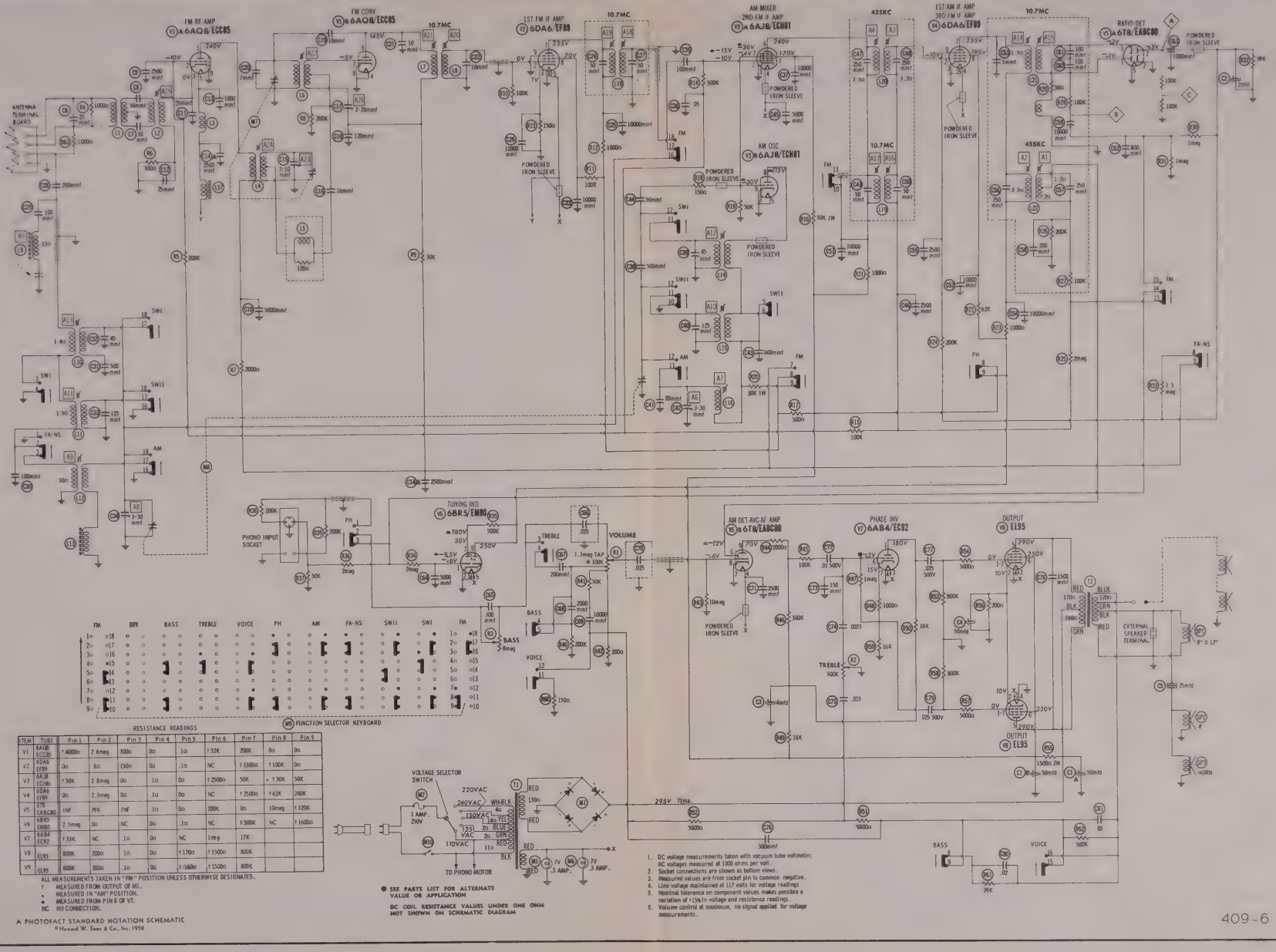
SET 409 FOLDER 6



CHASSIS TOP VIEW - ALIGN IDENT.



CHASSIS BOTTOM VIEW - ALIGN, INDUCTOR & MISC IDENT.



RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	6AQ8 ECC85	†4000Ω	2.6meg	300Ω	0Ω	1Ω	†32K	200K	0Ω	0Ω
V2	6DA6 EF89	0Ω	8Ω	150Ω	0Ω	.1Ω	NC	†1300Ω	†100K	0Ω
V3	6AJ8 ECH81	†50K	2.8meg	0Ω	1Ω	0Ω	†2500Ω	50K	- †30K	50K
V4	6DA6 EF89	0Ω	2.3meg	0Ω	.1Ω	0Ω	NC	†2500Ω	†62K	240K
V5	6T8 EABC80	INF	99K	INF	1Ω	0Ω	200K	0Ω	10meg	†320K
V6	6BR5 EM80	2.5meg	0Ω	NC	0Ω	.1Ω	NC	†500K	NC	†1600Ω
V7	6AB4 ECC92	†33K	NC	.1Ω	0Ω	NC	1meg	17K		
V8	EL95	800K	200Ω	1Ω	0Ω	†170Ω	†1500Ω	800K		
V9	EL95	800K	200Ω	1Ω	0Ω	†160Ω	†1500Ω	800K		

ALL MEASUREMENTS TAKEN IN "FM" POSITION UNLESS OTHERWISE DESIGNATED.
† MEASURED FROM OUTPUT OF M1.
- MEASURED IN "AM" POSITION.
● MEASURED FROM PIN 8 OF V1.
NC NO CONNECTION.

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings
5. Nominal tolerance on component values makes possible a variation of ±15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

A PHOTOFACT STANDARD NOTATION SCHEMATIC
© Howard W. Sams & Co., Inc. 1958

409-6

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

AM ALIGNMENT

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.01mfd	High side to pin 2 (grid) of 6AJ8/ECH81 (V3). Low side to chassis.	455KC (400~ Mod)	AM	Tuning gang fully open	Across voice coil	A1, A2, A3, A4	Adjust for maximum output.
2.	"	High side to AM Ant. receptacle. Low side to chassis.	"	"	"	"	A5	Adjust for MINIMUM output.
3.	"	"	1600KC	"	1600KC	"	A6	Adjust for maximum output.
4.	"	"	600KC	"	600KC	"	A7	"
5.	"	"	1400KC	"	Tune to 1400KC signal	"	A8	"
6.	"	"	600KC	"	Tune to 600KC signal		A9	Adjust for maximum output. Repeat steps 3, 4, 5 and 6.
7.	200mmf	"	12MC	SWII	12MC	"	A10, A11	Adjust for maximum output.
8.	"	"	22.5MC	SWI	22.5MC	"	A12, A13	"

FM IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting. Connect two matched 100K (±1%) resistors in series from point (A) to chassis. The junction of these two resistors is alignment point (C) as shown on the schematic.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
9.	200mmf	High side to pin 2 (grid) of 6DA6/EF89 (V4). Low side to chassis.	10.7MC (Unmod)	FM	Point of non-interference	DC probe to point (A). Common to chassis.	A14	Adjust for maximum deflection.
10.	"	"	"	"	"	DC probe to point (B). Common to point (C).	A15	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting.
11.	"	High side to pin 7 (grid) of 6AQ8/ECC85 (V1). Low side to chassis.	"	"	"	DC probe to point (A). Common to chassis.	A16, A17, A18, A19	Adjust for maximum deflection.
12.		High side to ungrounded tube shield on 6AQ8/ECC85 (V1). Low side to chassis.	"	"	"	"	A20, A21	"

FM IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Use frequency modulated signal with 60~ modulation and 450KC sweep. Use 120~ sawtooth voltage in scope for horizontal deflection.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT SCOPE	ADJUST	REMARKS
9.	200mmf	High side to pin 2 (grid) of 6DA6/EF89 (V4). Low side to chassis.	10.7MC (450KC Swp)	FM	Point of non-interference	Vert. Amp. to point (A). Low side to chassis.	A14	Disconnect stabilizing capacitor C2. Adjust for curve of maximum amplitude and symmetry similar to Fig. 1.
10.	"	"	"	"	"	Vert. Amp. to point (B). Low side to chassis.	A15	Reconnect C2. Adjust so that 10.7MC occurs at center of crossover lines similar to Fig. 2. SLIGHTLY retouch A14 for maximum amplitude and straightness of crossover lines.
11.	"	High side to pin 7 (grid) of 6AQ8/ECC85 (V1). Low side to chassis.	"	"	"	Vert. Amp. to point (A). Low side to chassis.	A16, A17, A18, A19	Disconnect C2. Adjust for curve of maximum amplitude and symmetry similar to Fig. 1.
12.	"	High side to ungrounded tube shield on 6AQ8/ECC85 (V1). Low side to chassis.	"	"	"	"	A20, A21	Adjust for curve of maximum amplitude and symmetry similar to Fig. 1. Reconnect stabilizing capacitor C2.

FM RF ALIGNMENT

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
13.	270Ω Carbon Resistor	Across FM Antenna terminals with 270Ω in high side.	105MC (Unmod)	FM	105MC	DC probe to point (A). Common to chassis.	A22, A23	Adjust for maximum deflection.
14.	"	"	91MC	"	91MC	"	A24, A25	"
15.	"	High side to ungrounded tube shield on 6AQ8/ECC85 (V1). Low side to chassis.	10.7MC	"	Point of non-interference	"	A26	Adjust for MINIMUM deflection.

FIG. 1

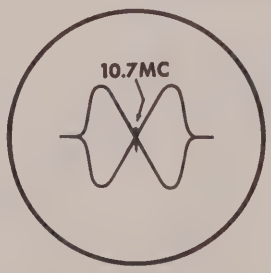


FIG. 2

PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE
V1	FM RF Amp. - FM Conv.	6AQ8/ECC85
V2	1st FM IF Amplifier	6DA6/EF89
V3	2nd FM IF Amplifier - AM Mixer - AM Osc.	6AJ8/ECH81
V4	3rd FM-1st AM IF Amp.	6DA6/EF89
V5	Ratio Det. - AM Det. - AVC-AF Amplifier	6T8/EABC80
V6	Tuning Indicator	6BR5/EM80
V7	Phase Inverter	6AB4/EC92
V8	Output	EL95
V9	Output	EL95

ELECTROLYTIC CAPACITORS

ITEM No.	RATING CAP.	RATING VOLT.	REPLACEMENT DATA BRAUN PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1A	50	385	RC62-05						R2462 *
B	50	385							
C2	2	80		PRS450V2	BR245		TD-2-450	MT-4502	TVA-1701
C3	4	385		PRS450V4	BR445	TC70	TD-4-450	MT-4504	TVA-1702
C4	50	15		PRS25V50	BBR50-25	TC29	TD-50-25	MT-0250	TVA-1206
C5	25	35		PRS50V25	BBR25-50	TC36	TD-25-50	MT-0525	TVA-1306

* Non-catalog item.

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING CAP.	RATING VOLT	REPLACEMENT DATA BRAUN PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C6	20			1468-00002	D6-200	5W5Q2	UC-542	1FM-42	
C7	30			1468-00003	D6-300	5W5Q3	UC-543	1FM-43	
C8	30			1468-00003	D6-300	5W5Q3	UC-543	1FM-43	
C9	2500			SI 2500	D6-252	LT6D25	UC-5225	5GA-D25	
C10	5000			SI 5000	D6-502	LT6D5	UC-525	5GA-D5	
C11	25			SI 25	D6-250	LT6Q25	UC-5425	5GA-Q25	
C12	25			SI 25	D6-250	LT6Q25	UC-5425	5GA-Q25	
C13	1000			SI 1000	D6-102	LT6D1	UC-521	5GA-D1	
C14A	2500			BPD-0025	DD-252	BYC6DD25	UC-5225	5GA-D25	
B	2500			BPD-0025	DD-252		UC-5225	5GA-D25	
C15	2-10		RC62-245						
C16	16								
C17	2-20		RC62-244						
C18	120			1468-00012	D6-121	5W5T12	UC-5312	1FM-312	
C19	10			SI 10	D6-100	LT6Q1	UC-541	5GA-Q1	
C20	7								
C21	10			SI 10	D6-100	LT6Q1	UC-541	5GA-Q1	
C22	10			SI 10	D6-100	LT6Q1	UC-541	5GA-Q1	
C23	10000			SI 10000	D6-103	LT6S1	DC511	5HK-S1	
C24	50			SI 50	D6-500	LT6Q5	UC-545	5GA-Q5	
C25	10000			SI 10000	D6-103	LT6S1	DC511	5HK-S1	
C26	10000			SI 10000	D6-103	LT6S1	DC511	5HK-S1	
C27	50			SI 50	D6-500	LT6Q5	UC-545	5GA-Q5	
C28	200			1468-0002	D6-201	5W5T2	MC237	1FM-32	
C29	100			1468-0001	D6-101	5W5T1	MC235	1FM-31	
C30	100			1468-0001	D6-101	5W5T1	MC235	1FM-31	
C31	500			1468-0005	D6-501	5W5T5	MC245	1FM-35	
C32	45								
C33	125								
C34	3-30		RC62-117						
C35	100			1468-0001	D6-101	5W5T1	MC235	1FM-31	
C36	.05	375		P488N-05	DF-503	CUB4S5	GEM-415	4TM-S5	
C37	10000			SI 10000	D6-103	LT6S1	DC511	5GA-S1	
C38	500			1468-0005	D6-501	5W5T5	MC245	1FM-T5	
C39	45								
C40	125								
C41	20			1468-00002	D6-200	LT6Q2	UC-542	1FM-42	
C42	3-30		RC62-117						
C43	600				D6-601	1W5T6		1FM-36	
C44	50			1468-00005	D6-500	5W5Q5	UC-545	1FM-45	
C45	5000			SI 5000	D6-502	LT6D5	UC-525	5GA-D5	
C46	2500			SI 2500	D6-252	LT6D25	UC-5225	5GA-D25	
C47	250			1468-00025	D6-251	5W5T25	UC-5325	1FM-325	
C48	250			1468-00025	D6-251	5W5T25	UC-5325	1FM-325	
C49	50			SI 50	D6-500	LT6Q5	UC-545	5GA-Q5	
C50	50			SI 50	D6-500	LT6Q5	UC-545	5GA-Q5	

PARTS LIST AND DESCRIPTIONS (Continued)

RESISTORS (cont)

ITEM No.	RATING OHMS	RATING WATT	BRAUN PART No.	NOTES
R50	16K			
R51	6800Ω			
R52	5000Ω			
R53	800K			
R54	5000Ω			
R55	1500Ω	2		
R56	200Ω			
R57	5000Ω			
R58	800K			
R59	16K			
R60	150Ω			
R61	39K			
R62	500K			
R63	1000Ω			

TRANSFORMER (POWER)

ITEM No.	RATING PRI.	RATING SEC. 1	RATING SEC. 2	REPLACEMENT DATA BRAUN PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T1	240V tap @ 220V, 150V, 125V, 110V, .52A @ 117VAC	230V @ .070A	6.3V @ 3A	RC62-011						

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE PRI.	IMPEDANCE SEC.	REPLACEMENT DATA BRAUN PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	NOTES
T2	5700Ω CT	14Ω tap @ 4Ω, 3Ω	RC62-015							

SPEAKER

ITEM No.	TYPE SIZE	TYPE FIELD	TYPE V. C. IMP.	REPLACEMENT DATA BRAUN PART No.	QUAM PART No.	NOTES
SP1	8" x12"	PM	3-4Ω	5711		
SP2	4"	PM	5Ω	5711-2		
SP3	Folded	Horn	3-4Ω	5711-7		

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA BRAUN PART No.	Meissner PART No.	Merit PART No.	Miller PART No.	Ram PART No.	NOTES
L1	FM Ant. Coil	RC62-032					
L2	FM Ant. Trans.	RC62-033					
L3	Fil. Choke		19-1006		4624		14 Microhenries
L4	FM RF Trans.						
L5	RF Choke						Wound on 120Ω resistor
L6	FM Osc. Coil	RC62-034					
L7	1st. FM IF Pri.						
L8	1st. FM IF Sec.						
L9	IF Trap Coil	RC62-02-1A					
L10	SW 1 Ant. Coil	RC62-019					
L11	SW 2 Ant. Coil	RC62-023					
L12	BC Ant. Coil	RC62-021					
L13	Loop Stick	RC62-082					
L14	SW 1 Osc. Coil	RC62-020					
L15	SW 2 Osc. Coil	RC62-024					
L16	BC Osc. Coil	RC62-022					
L17	Fil. Choke						
L18A	2nd. FM IF Pri.	RC62-038					
B	2nd. FM IF Sec.						
L19A	3rd. FM IF Pri.	RC62-044					
B	3rd. FM IF Sec.						
L20A	1st. AM IF Pri.						
B	1st. AM IF Sec.						
L21A	Ratio Det. Pri.	RC62-054					
B	Ratio Det. Sec.						
L22A	2nd. AM IF Pri.						
B	2nd. AM IF Sec.						

PARTS LIST AND DESCRIPTIONS (Continued)

CAPACITORS (cont)

ITEM No.	RATING CAP.	RATING VOLT	REPLACEMENT DATA BRAUN PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C51	10000			SI 10000	D6-103	LT6S1	DC511	5HK-S1	
C52	10000			SI 10000	D6-103	LT6S1	DC511	5HK-S1	
C53	5			SI 5	D6-050	LT6V5	ZT-555	5GA-V5	
C54	10000			SI 10000	D6-103	LT6S1	DC511	5HK-S1	
C55	2500			SI 2500	D6-252	LT6D25	UC-5225	5GA-D25	
C56	250			1468-00025	D6-251	5W5T25	UC-5325	1FM-325	
C57	250			1468-00025	D6-251	5W5T25	UC-5325	1FM-325	
C58	200			1468-0002	D6-201	5W5T2	MC237	1FM-32	
C59	10000			SI 10000	D6-103	LT6S1	DC511	5HK-S1	
C60	100			SI 100	D6-101	LT6T1	UC-531	5GA-T1	
C61	100			SI 100	D6-101	LT6T1	UC-531	5GA-T1	
C62	800					1W5T8		1FM-T8	
C63	1000			EF-001	MFT-1000			503C-D1	
C64	5000			SI 5000	D6-502	LT6D5	UC-525	5GA-D5	
C65	300			1468-0003	D6-301	5W5T3	MC341	1FM-43	
C66	.025	250		P488N-025		CUB4S22	GEM-4125	4TM-S22	
C67	200			1468-0002	D6-201	5W5T2	MC237	1FM-T2	
C68	2000			SI 2000	D6-202	LT6D2	UC-522	5GA-D2	
C69	10000			SI 10000	D6-103	LT6S1	DC511	5HK-S1	
C70	.025	250		P488N-025	DD-203	CUB4S22	GEM-4125	4TM-S22	
C71	2500			SI 2500	D6-252	LT6D25	UC-5225	5GA-D25	
C72	.01	500		P688N-01	D6-103	CUB6S1	GEM-611	6TM-S1	
C73	150			1468-00015	D6-151	5W5T15	MC236	1FM-315	
C74	.0033	300		P488N-0033	D6-332	CUB6D33	GEM-6233	6TM-D33	
C75	.015	250		P488N-015	DD16-153	CUB6S15	GEM-4115	4TM-S15	
C76	300			1468-0003	D6-301	5W5T3	MC241	1FM-33	
C77	.025	500		P688N-025	DD-203	CUB6S22	GEM-6125	6TM-S25	
C78	1500			SI 1500	D6-152	LT6D15	UC-5215	5GA-D15	
C79	.025	500		P688N-025	DD-203	CUB6S22	GEM-6125	6TM-S22	
C80	.02	150		P288N-02	DD-203	CUB2S2	GEM-412	4TM-S2	
C81	.03	150		P288N-03		CUB6S3	GEM-413	4TM-S3	

CONTROLS

ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA BRAUN PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
R1	1.3meg	½	RC62-010					Volume, Tap ⓐ 300K
R2	500K	½						Treble, Note 1
R3	8meg	½	RC62-086					Bass

Note 1. Some versions may use a 1meg control in this application (Part #RC62-087).

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING OHMS	RATING WATT	BRAUN PART No.	NOTES
R4	1000Ω			
R5	200K			
R6	300Ω			
R7	2000Ω			
R8	200K			
R9	30K			
R10	100K			
R11	100K			
R12	1000Ω			
R13	150Ω			
R14	500K			
R15	100K			
R16	50K	1		
R17	500Ω			
R18	150Ω			
R19	50K			
R20	30K	1		
R21	1000Ω			
R22	62K			
R23	1000Ω			
R24	200K			
R25	2meg			
R26	200K			
R27	100K			
R28	100K			
R29	50Ω			
R30	1meg			
R31	1meg			
R32	39K			
R33	1.5meg			
R34	2meg			
R35	500K			
R36	2meg			
R37	50K			
R38	200K			
R39	200K			
R40	200K			
R41	50K			
R42	200Ω			
R43	10meg			
R44	2000Ω			
R45	100K			
R46	300K			
R47	1meg			
R48	1000Ω			
R49	16K			

PARTS LIST AND DESCRIPTIONS (Continued)

SELENIUM RECTIFIER

ITEM No.	RATING CURRENT (Measured)	REPLACEMENT DATA BRAUN PART No.	FEDERAL PART No.	INTERNATIONAL PART No.	SARKES TARZIAN PART No.	NOTES
M1	.071A	RC62-06 (B250/C100)		60-9150 ①	D-64 ②	① Two used. ② Silicon Type.

FUSES

ITEM No.	TYPE	RATING	REPLACEMENT DATA BRAUN PART No. FUSE	BRAUN PART No. HOLDER	LITTELFUSE PART No. FUSE	LITTELFUSE PART No. HOLDER	BUSS PART No. FUSE	BUSS PART No. HOLDER
M2		1A 250V	RC62-1057 ①					

① Part #RC62-1056 (.6A) used with power source of 220-240V.

PHONO CARTRIDGE

ITEM No.	REPLACEMENT DATA BRAUN PART No.	ASTATIC PART No. CARTRIDGE	ASTATIC PART No. NEEDLE	ELECTRO-VOICE PART No. CARTRIDGE	ELECTRO-VOICE PART No. MOUNT	REMARKS
M3						

PHONO NEEDLE

(FOR REPLACEMENT IN ORIGINAL EQUIPMENT CARTRIDGE)

ITEM No.	REPLACEMENT DATA BRAUN PART No.	JENSEN PART No.	WALCO PART No.	REMARKS
M4		†♦ TE18SD ♦ TE18D		† Jewel ♦ Diamond

MISCELLANEOUS

ITEM No.	PART NAME	BRAUN PART No.	NOTES
M5	Lamp		7 Volt, 0.3A
M6	Lamp		7 Volt, 0.3A
M7	FM Tuner Ass'y.	RC62-025	
M8	Tuning Cap.	RC62-031	2 Gang, AM (Ant. 9-550mmf, Osc. 11-550mmf)
M9	Switch	RC62/1-017	Band, Function, Pushbutton, Slide Type
M10	Switch	RC62 GN64	Power Off-On, Toggle Type

CABINETS & CABINET PARTS

(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

NAME	PART NO.	DESCRIPTION
Dial Glass	RC62/1-1013	
Knob	RC62-094	Large
Knob	RC62-096	Small
AM Dial Pointer	RC62-1007	
FM Dial Pointer	RC62-1008	

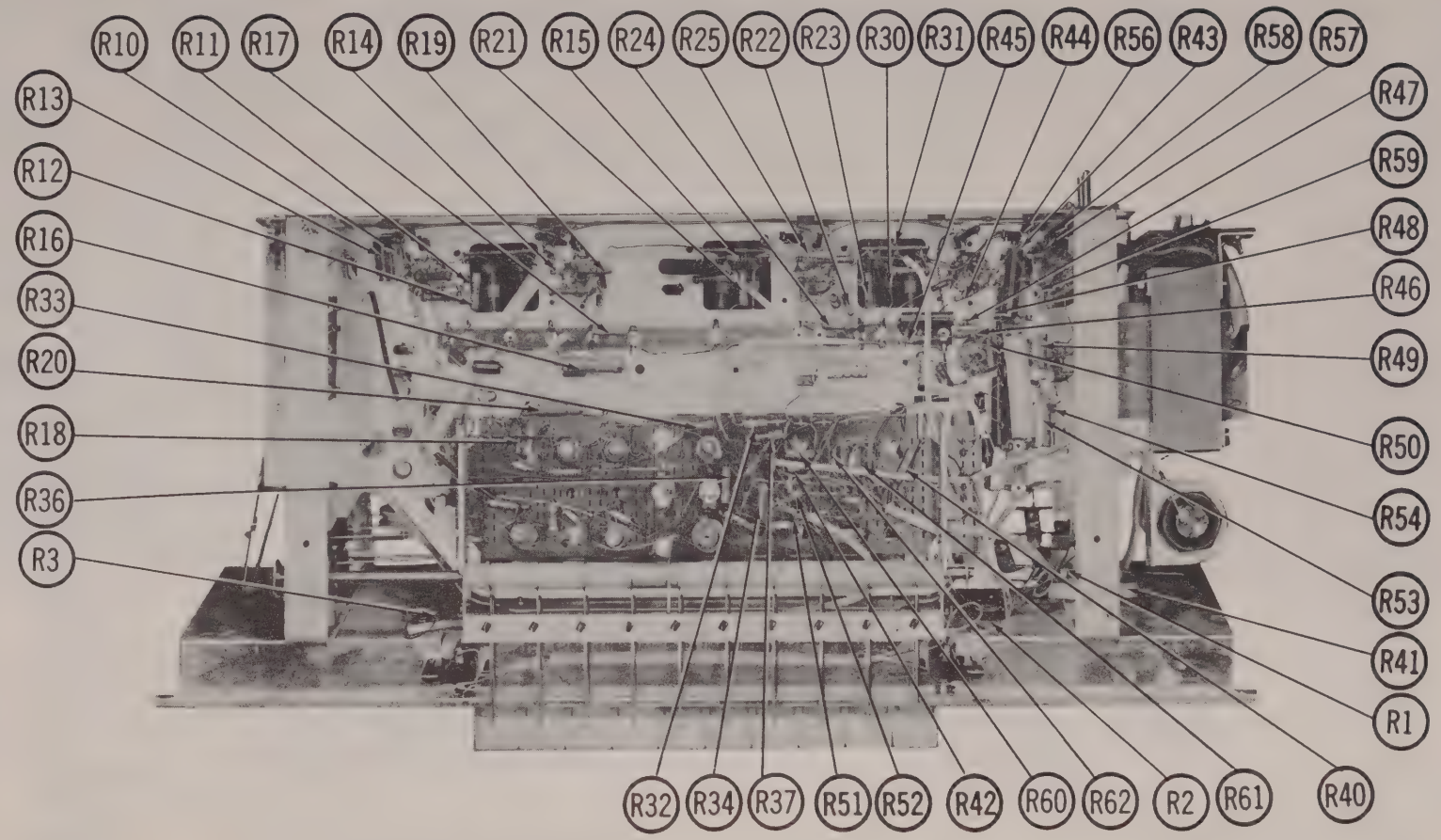
WIRING DATA

General-use Unshielded Hook-up Wire ..... Use BELDEN No. 8530 (Solid) Available in Ten Colors
8524 (Stranded) Available in Ten Colors

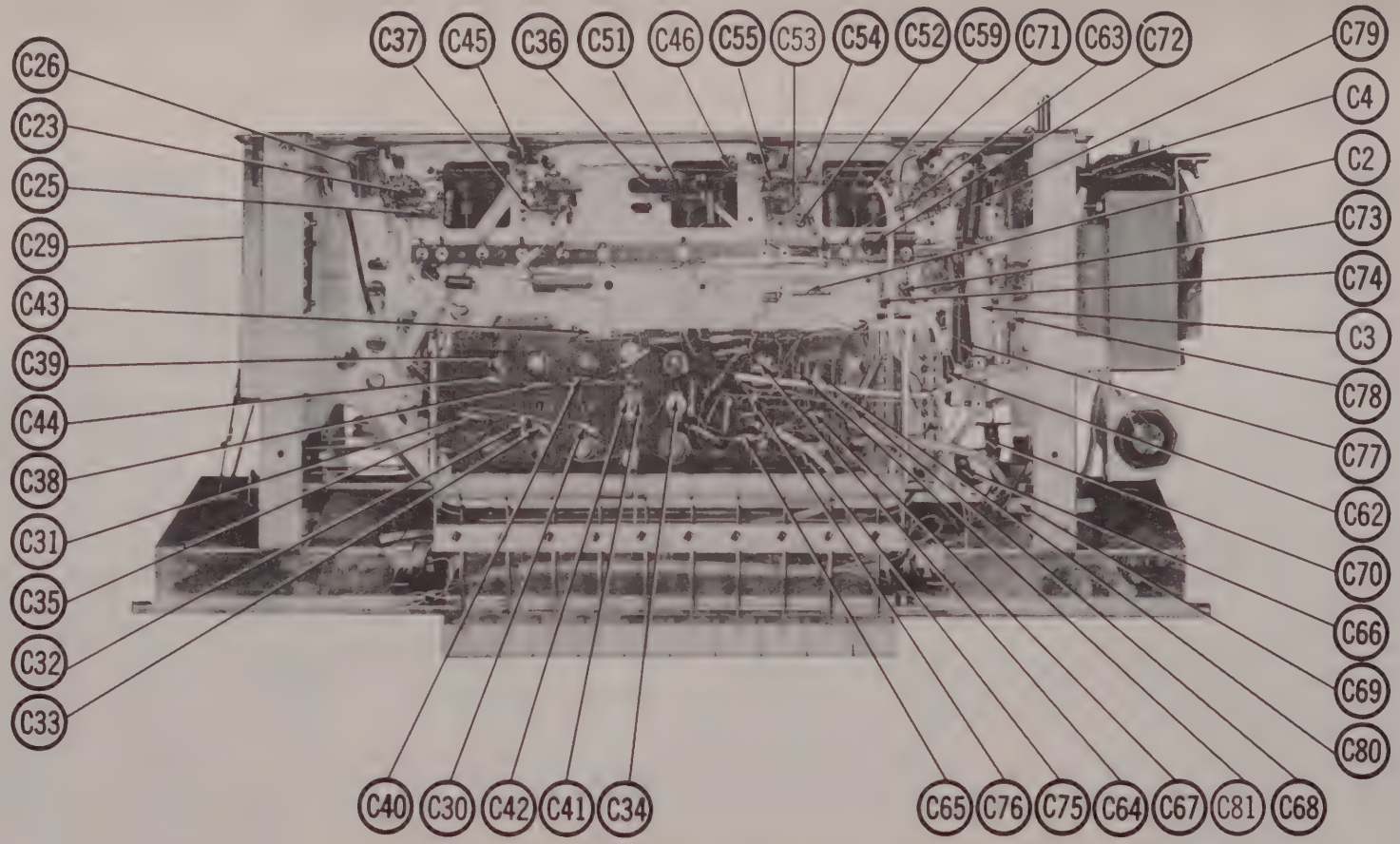
Power Cord ..... Use BELDEN No. 1765-B (6 Ft. Length)
1725-K (7½ Ft. Length)

Low-Loss Shielded Lead (Interconnecting) ..... Use BELDEN No. 8401

Phono Pick-up Arm Cable ..... Use BELDEN No. 8430 (Two Conductor - Twisted)

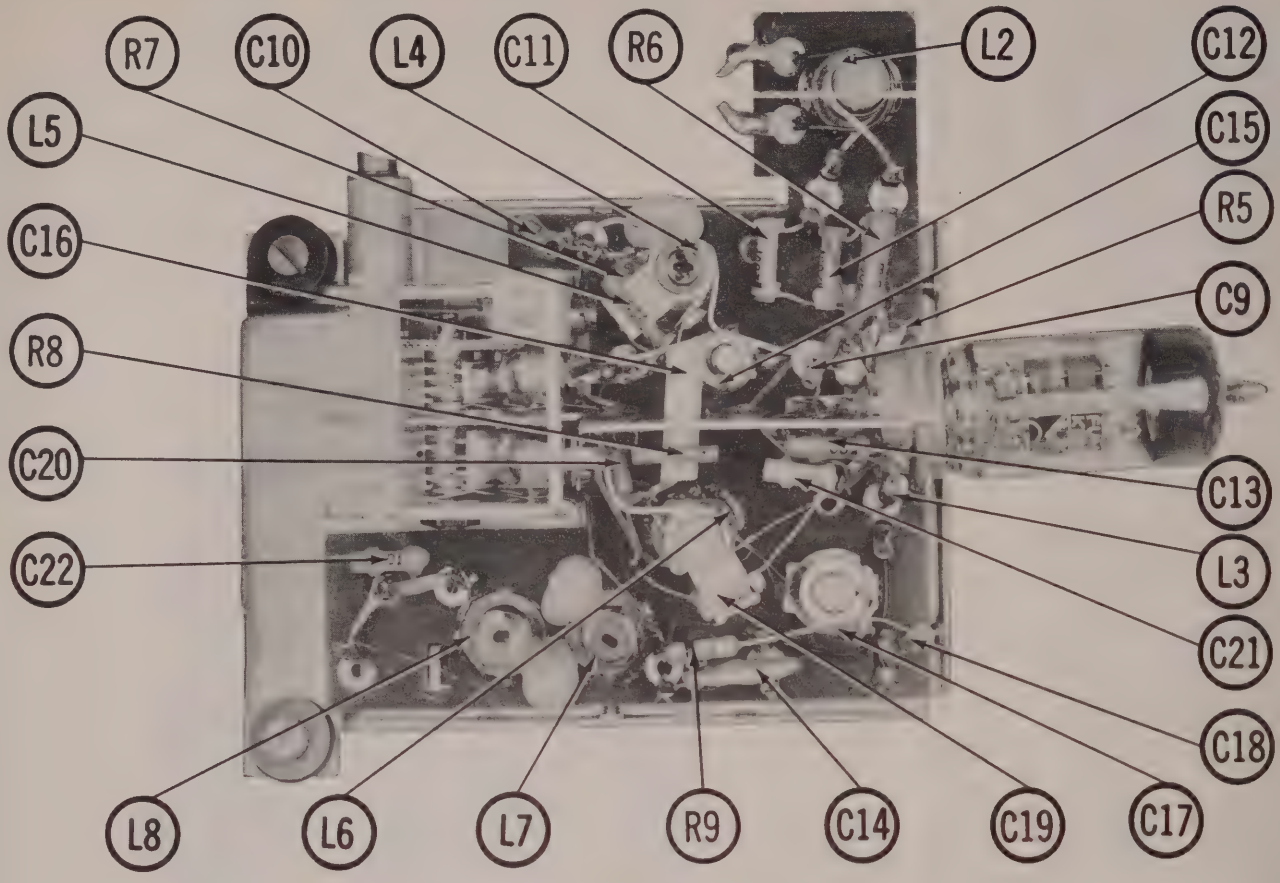


CHASSIS BOTTOM VIEW-RESISTOR IDENTIFICATION

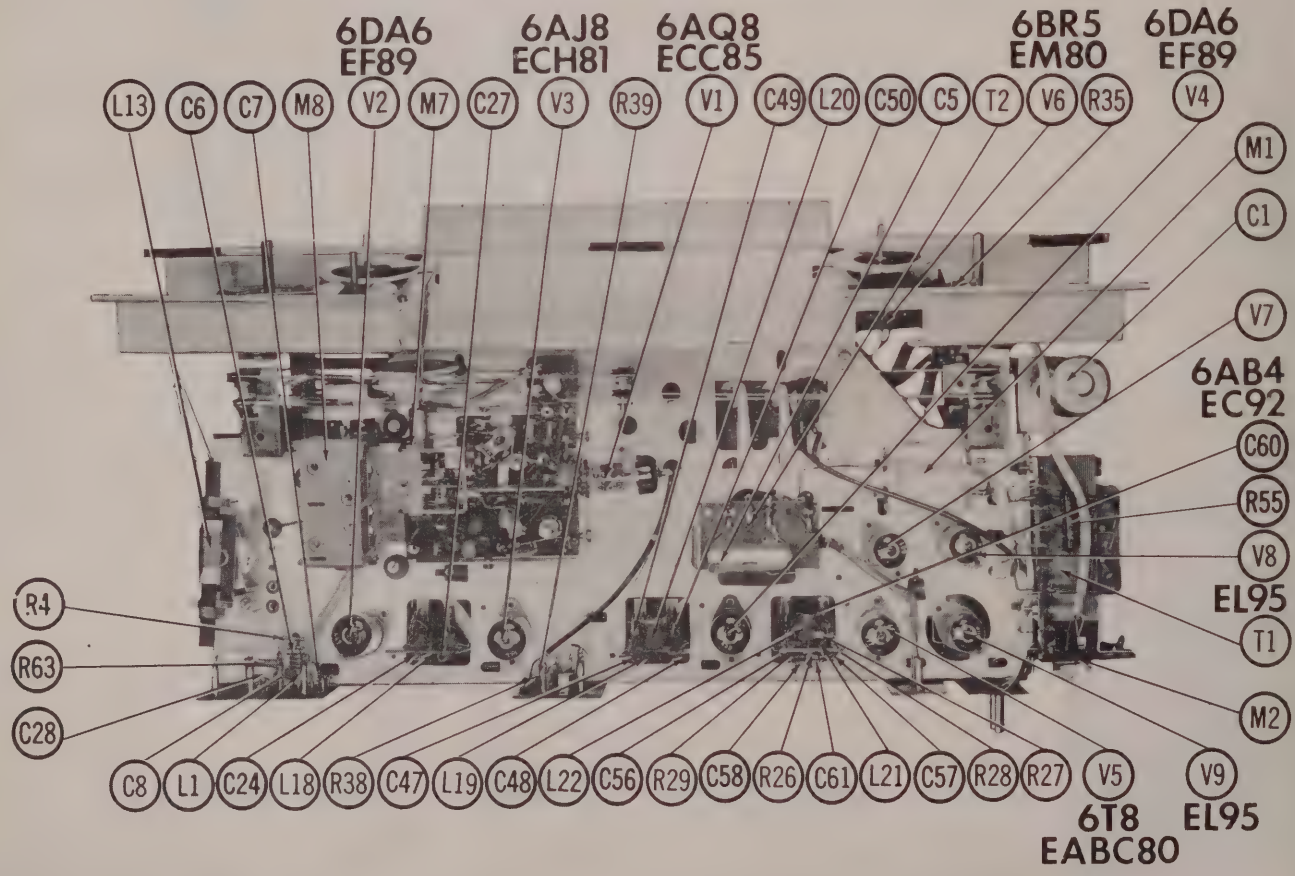


CHASSIS BOTTOM VIEW-CAPACITOR IDENTIFICATION

BRAUN
MODEL MM4D (CH. RC-62)



FM RF SUB-CHASSIS



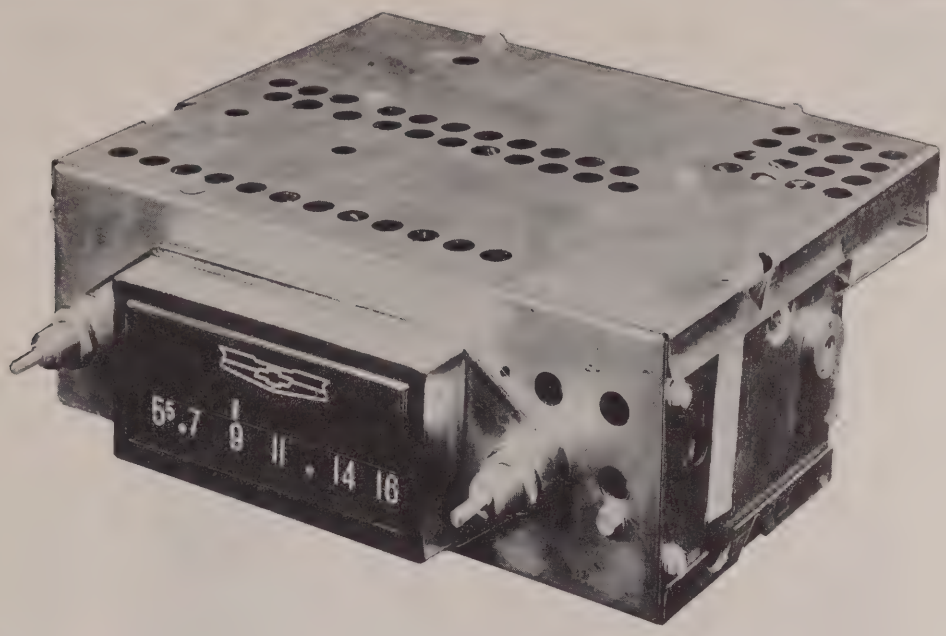
CHASSIS - TOP VIEW

PHOTOFACT* Folder

EIA MEMBER ELECTRONIC INDUSTRIES ASSOCIATION

CHEVROLET
MODEL 987724

CHEVROLET
MODEL 987724



TRADE NAME	Chevrolet Model 987724 (For 1958 Chevrolet Automobiles)
MANUFACTURER	Delco Radio Div., G.M. Corp., Kokomo, Indiana
TYPE SET	Battery Operated Custom Built AM Automobile Receiver
TUBES (Six)	Types 12BA6 RF Amplifier, 12BE6 Converter, 12BA6 IF Amplifier, 12AV6 Det.-AVC-AF Amplifier, 12V6GT Output, 0Z4 Rectifier
POWER SUPPLY	12 Volt Storage Battery
RATING	2.2 Amp. @ 12.6 Volts DC
TUNING RANGE—BROADCAST	540-1600KC

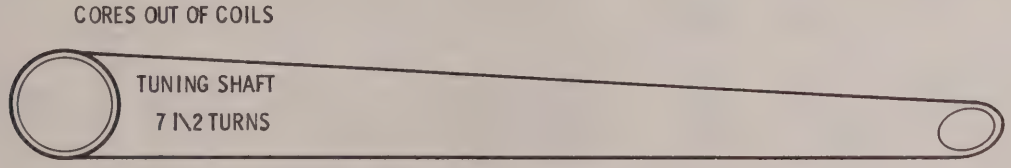
CHEVROLET
MODEL 987724

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.1mfd	High side to pin 7 (grid) of 12BE6 (V2). Low side to chassis.	262KC (400~ Mod)	High frequency end stop	Across voice coil	A1, A2, A3, A4	Adjust for maximum output.
2.	68mmf	High side to Antenna Receptacle. Low side to chassis.	1615KC	"	"	A6, A7, A8	Check setting of osc. coil core (A5). Rear of core should be 1 5/8" from mounting end of coil form. Adjust for maximum output.
3.	"	"	600KC	Tune to 600KC signal	"	A9, A10	Adjust for maximum output.
4.	"	"	1615KC	High frequency end stop	"	A7, A8	"
5.	With radio tuned to a 1100KC signal, adjust pointer on dial cord to coincide with 1100KC mark on dial.						
6.	With radio installed in car and antenna fully extended, tune in a weak station near 1000KC and adjust A8 for maximum output.						



DIAL CORD STRINGING

HOWARD W. SAMS & CO., INC. • Indianapolis 5, Indiana

The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed. Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. © 1958 Howard W. Sams & Co., Inc., Indianapolis 5, Indiana. Printed in U.S. of America

H584

SET 409 FOLDER 7

PARTS LIST AND DESCRIPTIONS

CHEVROLET
MODEL 987724

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V1	RF Amplifier	12BA6	
V2	Converter	12BE6	
V3	IF Amplifier	12BA6	
V4	Det.-AVC-AF Amp.	12AV6	
V5	Output	12V6GT	
V6	Rectifier	0Z4	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING CAP.	RATING VOLT.	REPLACEMENT DATA DELCO PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1A	■20	400	6309	AFH2-51	B0400	FP234	TMD-50	D-215	TVL-2755
B	▲20	400							

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING CAP.	RATING VOLT	REPLACEMENT DATA DELCO PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C2A	7-67		7270434						
B	37								
C3	.047	200	6612	P288N-047	DF-503	CUB2S47	GEM-4147	2TM-S47	
C4	15		6361	NPO-DI 15	DD-150	L10Q15	UC-5415	5GA-Q15	10%
C5	39		6366	DI-000039	DD-390	L10Q39	UC-5439	5GA-Q39	
C6A			7268828						
B									
C									
D									
C7	200		7270129	1469-0002		22R5T2	MCE237	MS-32	5%
C8	.047	400	6612	P488N-047	DF-503	CUB4S47	GEM-4147	4TM-S47	
C9	2000		6352	BPD-002	DD-203	BYA10D2	DC522	5HK-D2	
C10	.01	400	6610	P488N-01	D6-103	CUB4S1	GEM-411	4TM-S1	
C11	.047	400	6612	P488N-047	DF-503	CUB4S47	GEM-4147	4TM-S47	
C12	1000		6350	BPD-001	DD-102	BYA6D1	DC521	5HK-D1	
C13	.002	600		P688N-002	D6-202	CUB6D2	GEM-622	6TM-D2	①
C14	.007	1600	6567	P1688N-007	DD16-702	CUB16D7	GEM-1627	MB-D7	
C15	.1	200	6690	P288N-1	DF-104	CUB2P1	GEM-201	2TM-P1	
C16	.47	100	6692	P288N-47		CUB2P47	GEM-2047	2TM-P47	
C17	.1	200	6690	P288N-1	DF-104	CUB2P1	GEM-201	2TM-P1	
C18A			1220885						
B									

① Some versions use . 006mfd 800V in this application (Part #6566).

CONTROLS

ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA DELCO PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	2meg	½	122113					Tone
B	300K	½						Volume
C	Switch							On-Off

RESISTORS

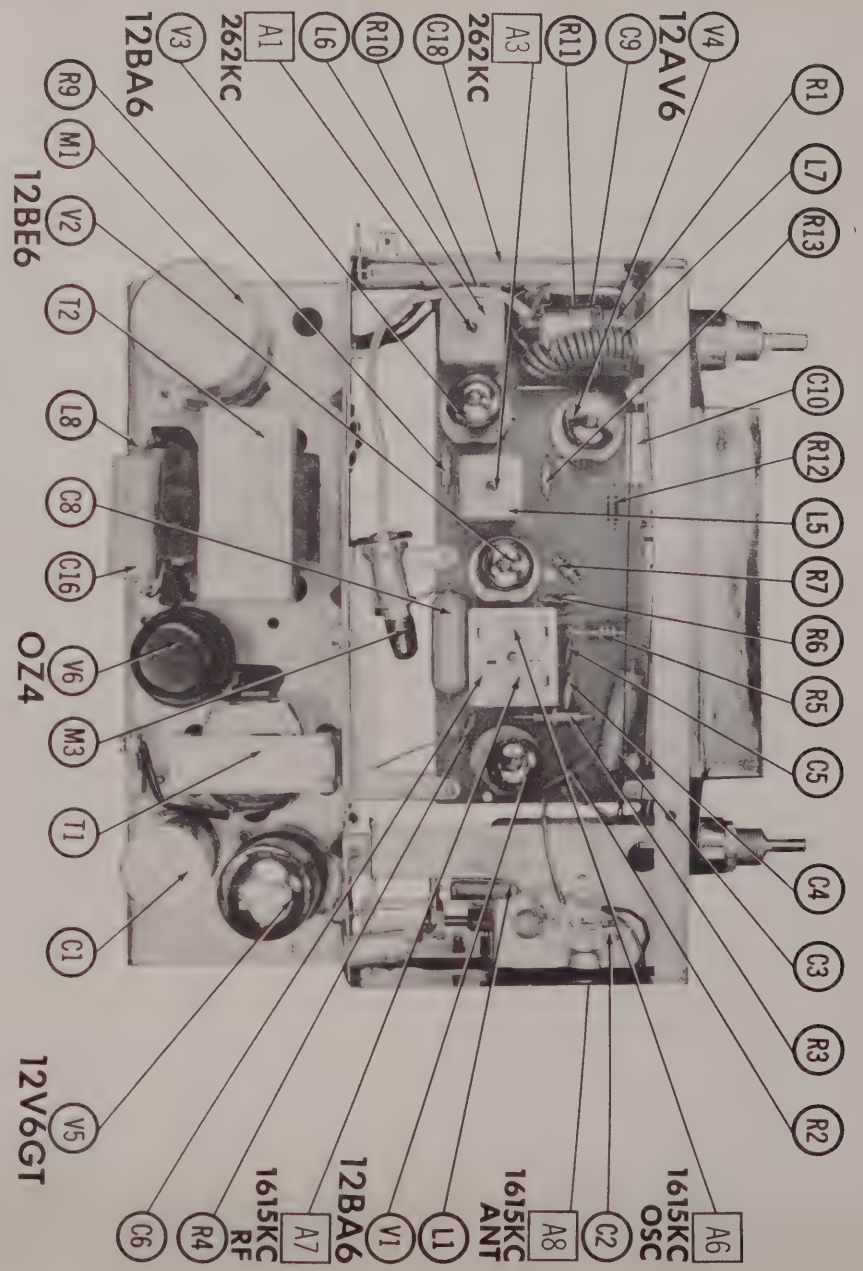
All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING OHMS	RATING WATT	DELCO PART No.	NOTES
R2	2.2meg		1239	
R3	10K	1	1174	
R4	150Ω		1115	
R5	330K		1229	
R6	100Ω		1113	
R7	22K		1215	
R8	15K	2	1277	
R9	330Ω		1119	

ITEM No.	RATING OHMS	RATING WATT	DELCO PART No.	NOTES
R10	47K		1219	
R11	1meg		1235	
R12	6.8meg		1245	
R13	220K		1117	
R14	220K		1227	
R15	330Ω	1	1156	
R16	1800Ω	(WW)	1204	①
R17	15K	1	1253	

① Replace with 5600Ω 1W (Part #1171) and 2700Ω 2W (Part #1204) connected in parallel.

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (VIBRATOR)

ITEM No.	RATING			REPLACEMENT DATA						
	PRI.	SEC. 1	SEC. 2	DELCO PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T1	12.6VCT @ 1.8A	530VCT @ .052A		7265604		P-2860 ①		P-6497	22R79 ①	

① Use original channel frame.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA							NOTES
	PRI.	SEC.	DELCO PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T2	6000Ω	3-4Ω	6062	Z1002 ①	A-3019 ①		A-4431	26S49 ①	S-5Z ①	① Use original channel frame.

SPEAKER

ITEM No.	TYPE			REPLACEMENT DATA		NOTES
	SIZE	FIELD	V. C. IMP.	DELCO PART No.	QUAM PART No.	
SP1	6" X 9"	PM	3-4Ω	7269880 ①	69A2	① Alternate Part #7269884

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA					
		DELCO PART No.	Meissner PART No.	Merit PART No.	Miller PART No.	Ram PART No.	NOTES
L1	Antenna Coil	7255738	19-1004	BC-565	4610		6.5 Microhenries
L2	Antenna Coil	1221138					
L3	RF Coil	1221138					
L4	Osc. Coil	1221151					
L5	Input IF	1220990	16-6756	BC-317	13-PH1		
L6	Output IF	1220992		BC-320	13-PH6		
L7	Fil. Choke	1217846					1.4 Microhenry
L8	Hash Choke	7269252					

VIBRATOR

ITEM No.	TYPE	INPUT VOLTS	FREQUENCY	REPLACEMENT DATA				NOTES
				DELCO PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	RADIART PART No.	
M1	Interrupter	12.6 VDC	115~	8555	6330	G1602/G883	6330	

FUSES

ITEM No.	TYPE	RATING	REPLACEMENT DATA					
			DELCO PART No.		LITTELFUSE PART No.		BUSS PART No.	
			FUSE	HOLDER	FUSE	HOLDER	FUSE	HOLDER
M2		7½A 32V	455107					

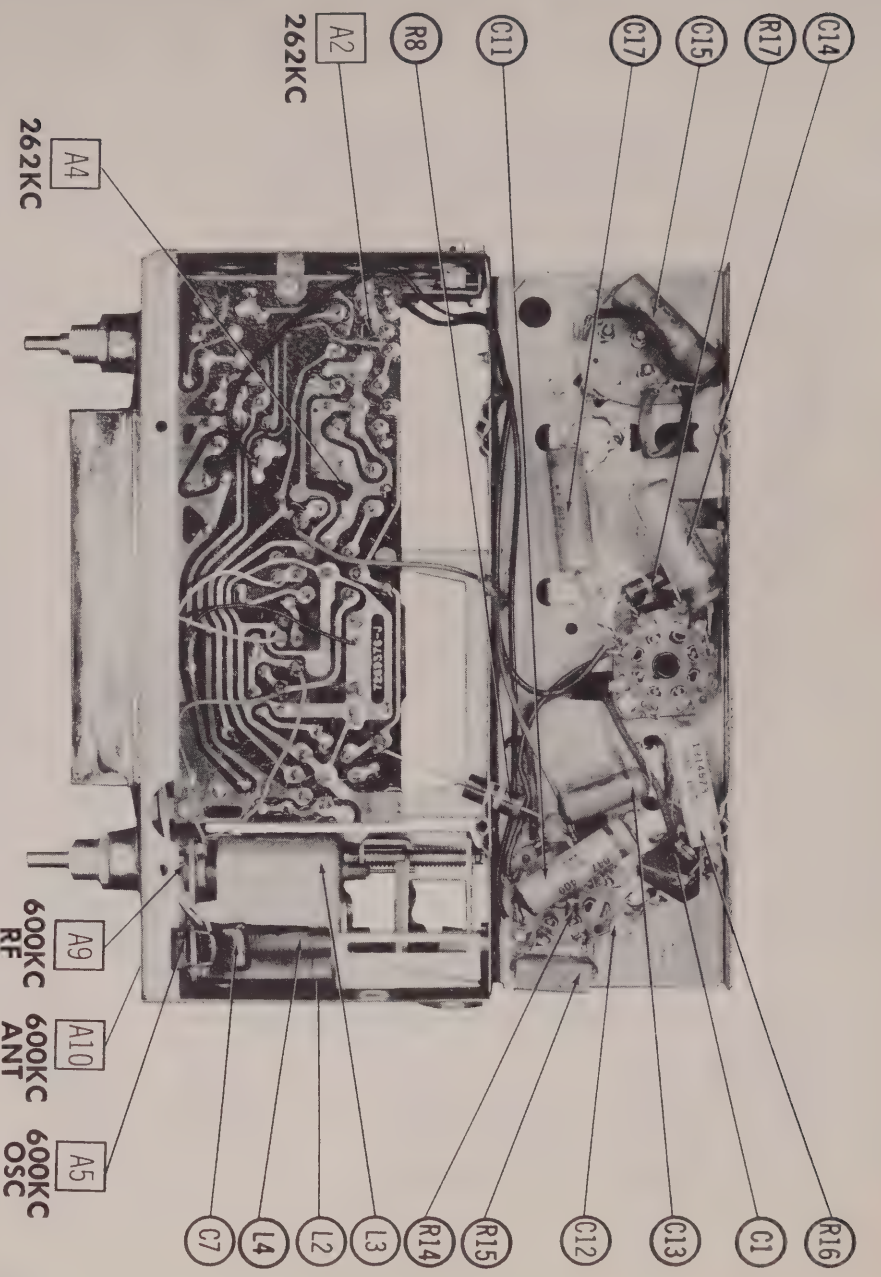
MISCELLANEOUS

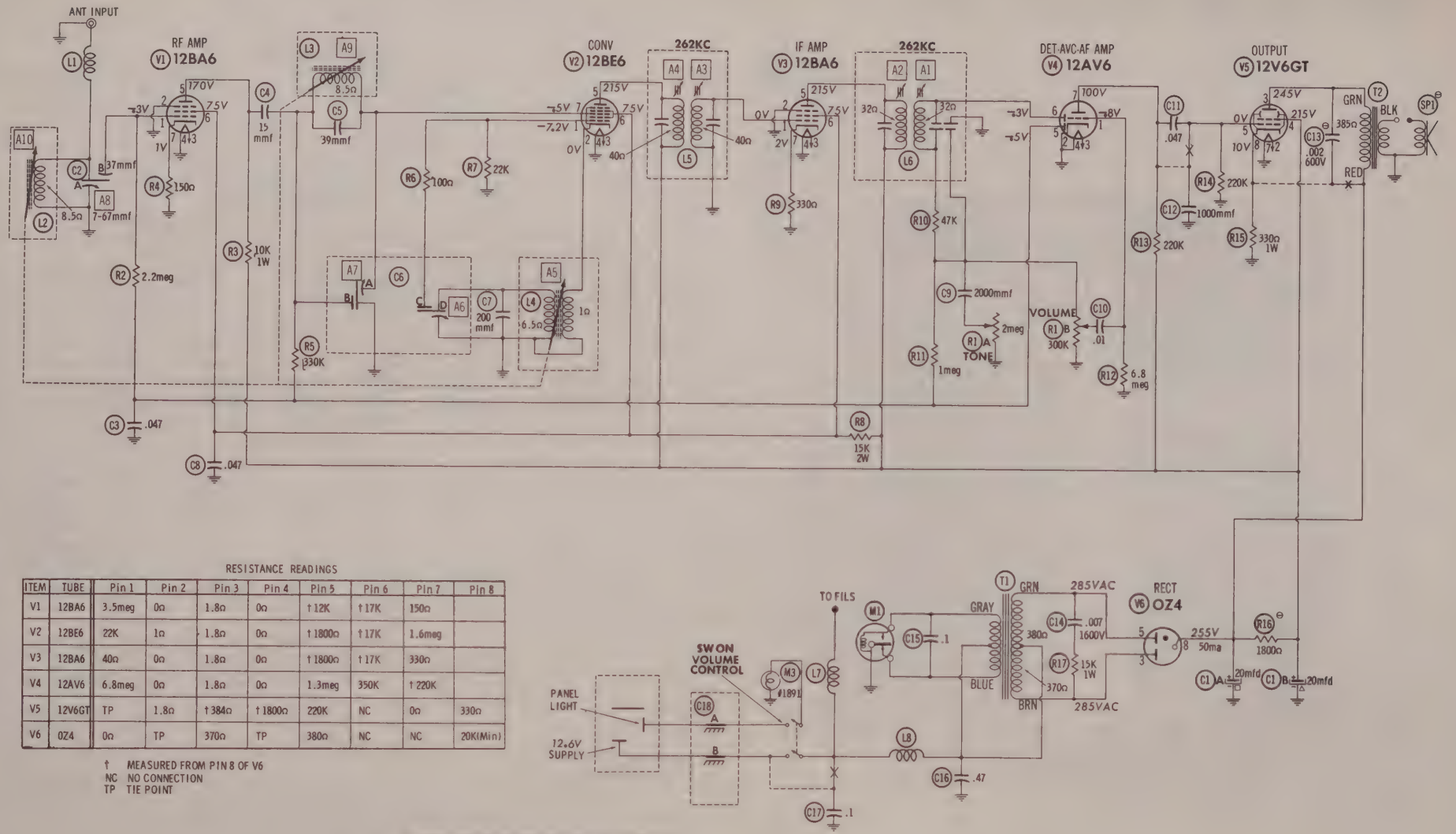
ITEM No.	PART NAME	DELCO PART No.	NOTES
M3	Lamp		#1891
	Pointer Ass'y	7270447	
	Printed Board	7269376-J	
	Speaker Ass'y	Model 987765	Complete 6" X 9" Rear Seat installation.
	Speaker Ass'y	Model 987766	Complete 6" Round Rear Seat installation.

WIRING DATA

General-use Unshielded Hook-up Wire ..... Use BELDEN No. 8530 (Solid) Available in Ten Colors
8524 (Stranded) Available in Ten Colors
Shielded Hook-up Wire ..... Use BELDEN No. 8885
Bonding Strap ..... Use BELDEN No. 8661

CHASSIS—BOTTOM VIEW





RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8
V1	12BA6	3.5meg	0Ω	1.8Ω	0Ω	†12K	†17K	150Ω	
V2	12BE6	22K	1Ω	1.8Ω	0Ω	†1800Ω	†17K	1.6meg	
V3	12BA6	40Ω	0Ω	1.8Ω	0Ω	†1800Ω	†17K	330Ω	
V4	12AV6	6.8meg	0Ω	1.8Ω	0Ω	1.3meg	350K	†220K	
V5	12V6GT	TP	1.8Ω	†384Ω	†1800Ω	220K	NC	0Ω	330Ω
V6	0Z4	0Ω	TP	370Ω	TP	380Ω	NC	NC	20K(Min)

† MEASURED FROM PIN 8 OF V6
NC NO CONNECTION
TP TIE POINT

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Battery voltage maintained at 12.6 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ±15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

Θ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM

A PHOTOFACT STANDARD NOTATION SCHEMATIC

©Howard W. Sams & Co., Inc. 1958

PHOTOFACT* Folder

EIA MEMBER ELECTRONIC INDUSTRIES ASSOCIATION

GENERAL ELECTRIC
MODELS T-115A, T-116

GENERAL ELECTRIC
MODELS T-115A, T-116

MODEL T-115A

GENERAL ELECTRIC
MODELS T-115A, T-116

TRADE NAME	General Electric Models T-115A, T-116
MANUFACTURER	General Electric Co., Products Service, Radio Receiver Dept., 869 Broad St., Utica, N.Y.
TYPE SET	AC-DC Operated AM Receiver
TUBES (Six)	Types 12BA6 RF Amplifier, 12BE6 Converter, 12BA6 IF Amplifier, 12AV6 Det.-AVC-AF Amp., 35C5 Output, 35W4 Rectifier
POWER SUPPLY	105-120 Volts AC-DC RATING .29 Amp. @117 Volts AC (27 Watts)
TUNING RANGE—BROADCAST	535-1620KC

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Use isolation transformer, if available, If not, connect a .1mfd capacitor in series with low side of signal generator and B—. Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.
Radio-Phono switch in radio position.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.05mfd	High side to pin 7 (grid) of 12BE6 (V2) Low side to chassis.	455KC (400~ Mod.)	Tuning gang fully open.	Across Voice Coil	A1, A2, A3, A4	Adjust for maximum output.
2.		Loop	1620KC	"	"	A5	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
3.		"	1500KC	Tune to 1500 KC signal.	"	A6, A7	"
4.		"	600KC	Tune to 600 KC signal.	"	A8	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output while rocking tuning gang. Repeat Steps 2, 3, and 4

HOWARD W. SAMS & CO., INC. • Indianapolis 5, Indiana

The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed. Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. © 1958 Howard W. Sams & Co., Inc., Indianapolis 5, Indiana. Printed in U.S. of America

H554

SET 409 FOLDER 8

PARTS LIST AND DESCRIPTIONS

GENERAL ELECTRIC
MODEL T-115A

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V1	RF Amplifier	12BA6	
V2	Converter	12BE6	
V3	IF Amplifier	12BA6	
V4	Det. -AVC-AF Amp.	12AV6	
V5	Output	35C5	
V6	Rectifier	35W4	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						
	CAP.	VOLT.	G. E. PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1A	100	150	RS-1134	PRS150V80402O	BBRD0183. 7	TCT3117	TDLD-14	FMT-339	TVA-3455
B	50	150							

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA						NOTES
	CAP.	VOLT	G. E. PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	
C2	.05	200		P288N-05	DF-503	CUB2S5	GEM-415	2TM-S5	
C3	1. 8		RS-1191						N220
C4	47		RCW-3075						
C5	150		RS-1204	BPD-00015	DD-151	L10T15	UC-5315	5GA-T15	
C6	220		RS-1203	BPD-00022	DD-221	L10T22	UC-5322	5GA-T22	
C7	220		RS-1203	BPD-00022	DD-221	L10T22	UC-5322	5GA-T22	
C8	.02	400		P488N-02	DD-203	CUB4S2	GEM-412	4TM-S2	
C9	.02	400		P488N-02	DD-203	CUB4S2	GEM-412	4TM-S2	
C10	6800		RS-1202	BPD-0068	DD-682	BYA10D68	UC-5268	5GA-D68	
C11	.1	200		P288N-1	DF-104	CUB2P1	GEM-201	2TM-P1	
C12	.022	200		P288N-022	DD-203	CUB2S22	GEM-4122	2TM-S22	
C13	.047	200	RCN-109	P288N-047	DF-503	CUB2S47	GEM-4147	2TM-S47	
C14	.047	600	RCN-109	P688N-047	DF-503	CUB6S47	GEM-6147	6TM-S47	
C15	.05	400		P488N-05	DF-503	CUB4S5	GEM-415	4TM-S5	

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESIST-ANCE	WATTS	G. E. PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	
R1A	4meg	½	RS-1131				PP46T26	Volume, Tap Ⓐ 2 meg
B	Switch							Power On-Off (Push-Pull)
R2	200K	½	RS-1132					Tone, Tap & Stop Ⓑ 100K

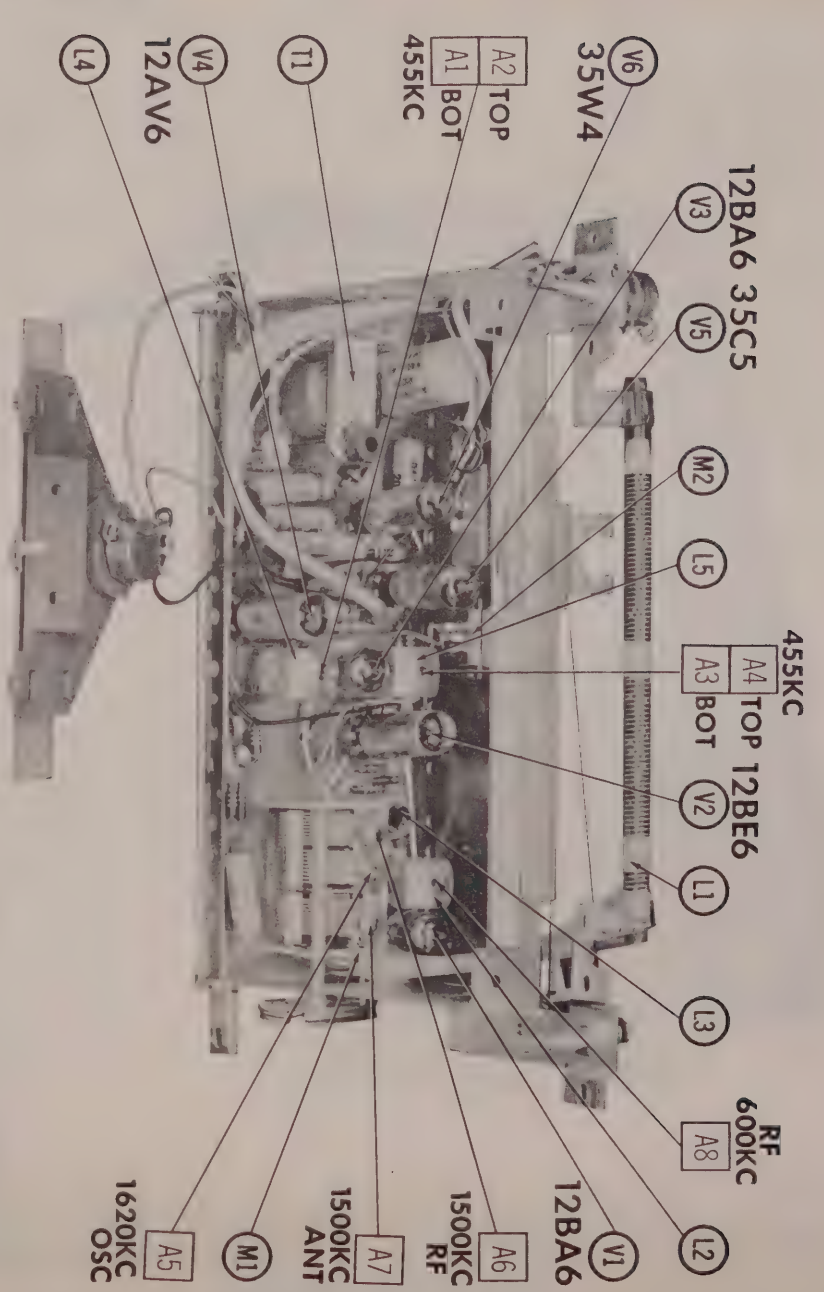
RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING		G. E. PART No.	NOTES
	OHMS	WATT		
R3	22Ω			
R4	22K			
R5	100Ω			
R6	120Ω			
R7	33K			
R8	330K			
R9	2. 2meg			
R10	6. 8meg			
R11	470K			

ITEM No.	RATING		G. E. PART No.	NOTES
	OHMS	WATT		
R12	470K			
R13	150Ω			
R14	1000Ω	2		
R15	4700Ω			
R16	820Ω			
R17	15K			
R18	4700Ω			
R19	10Ω			

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA							NOTES
	PRI.	SEC. 1	G. E. PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T1	2200Ω Tap ⓐ 3%	5-6Ω	RS-1144							
	TURNS RATIO	SEC. 2								
	4.2	:1								

SPEAKER

ITEM No.	TYPE			REPLACEMENT DATA		NOTES
	SIZE	FIELD	V. C. IMP.	G. E. PART No.	QUAM PART No.	
SP1	6½"	PM	3-4Ω	RB-1017	6A1	
SP2	4"	PM	2-3Ω	RB-1036	4A07Z2.5	

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA					NOTES
		G. E. PART No.	Meissner PART No.	Merit PART No.	Miller PART No.	Ram PART No.	
L1	Loop Stick	RS-1141					
L2	RF Trans.	RS-1145					
L3	Osc. Coil	RS-1142					
L4	Input IF	RS-1143	16-6780	BC-356	13-PC9	RF-4	
L5	Output IF	RS-1143	16-6780	BC-357	13-PC10	RF-4	

MISCELLANEOUS

ITEM No.	PART NAME	G. E. PART No.	NOTES
M1	Tuning Cap.	RS-1140	3 gang (Ant. 30-310mmf)
M2	Switch	RS-1128	Radio-Phono, Slide Type
	Printed Board	204E116-12	

CABINETS & CABINET PARTS

(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

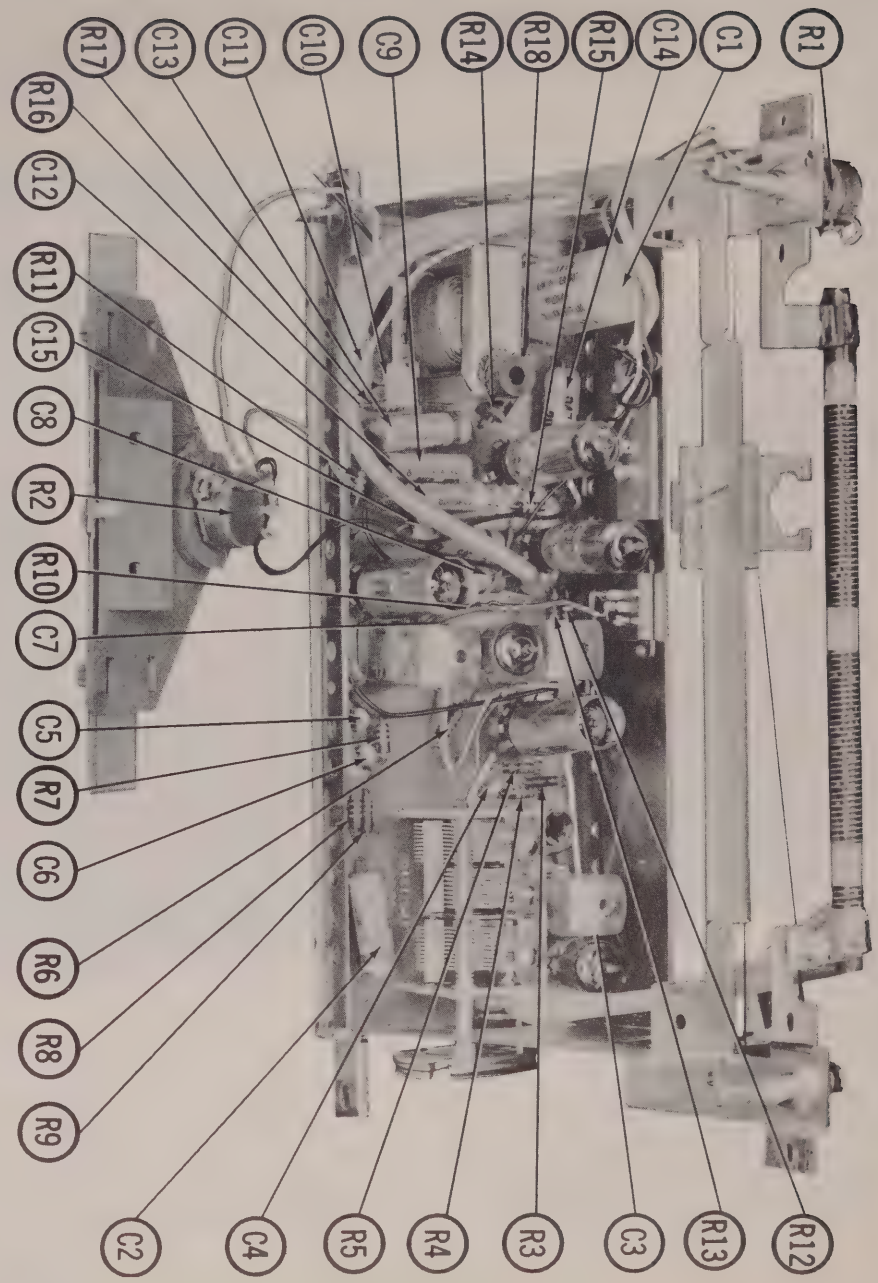
NAME	PART NO.	DESCRIPTION
Dial Crystal	RS-1117	
Knob	RS-1118	Tuning, Volume
Knob	RS-1119	Tone
Front Cabinet	RB-1013	Brown, Model T-115
Front Cabinet	RB-1014	Ivory, Model T-116
Back Cabinet	RB-1015	Brown, Model T-115
Back Cabinet	RB-1016	Ivory, Model T-116
Pointer	RS-1123	

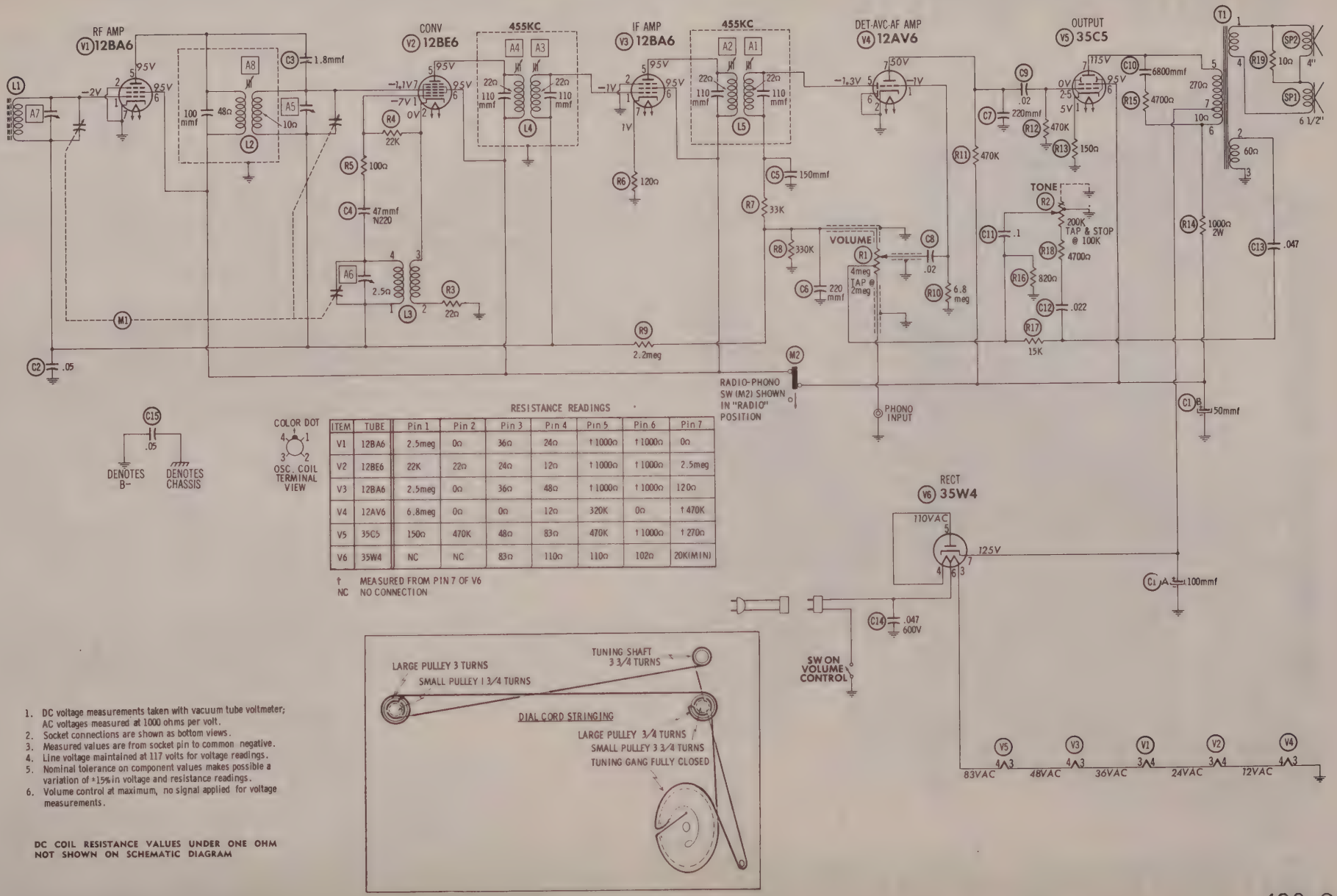
WIRING DATA

General-use Unshielded Hook-up Wire ..... Use BELDEN No. 8530 (Solid) Available in Ten Colors
8524 (Stranded) Available in Ten Colors

Power Cord ..... Use BELDEN No. 1765-B (6 Ft. Length)
1725-K (7½ Ft. Length)

CHASSIS—TOP VIEW





RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
V1	12BA6	2.5meg	0Ω	36Ω	24Ω	†1000Ω	†1000Ω	0Ω
V2	12BE6	22K	22Ω	24Ω	12Ω	†1000Ω	†1000Ω	2.5meg
V3	12BA6	2.5meg	0Ω	36Ω	48Ω	†1000Ω	†1000Ω	120Ω
V4	12AV6	6.8meg	0Ω	0Ω	12Ω	320K	0Ω	†470K
V5	35C5	150Ω	470K	48Ω	83Ω	470K	†1000Ω	†270Ω
V6	35W4	NC	NC	83Ω	110Ω	110Ω	102Ω	20K(MIN)

† MEASURED FROM PIN 7 OF V6
NC NO CONNECTION

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ±15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM

A PHOTOFACT STANDARD NOTATION SCHEMATIC

©Howard W. Sams & Co., Inc. 1958

PHOTOFACT* Folder

EIA MEMBER ELECTRONIC INDUSTRIES ASSOCIATION

GRUNDIG MAJESTIC
MODELS 7000, 7005, 7015

GRUNDIG MAJESTIC
MODELS 7000, 7005, 7015

GRUNDIG MAJESTIC
MODELS 7000, 7005, 7015

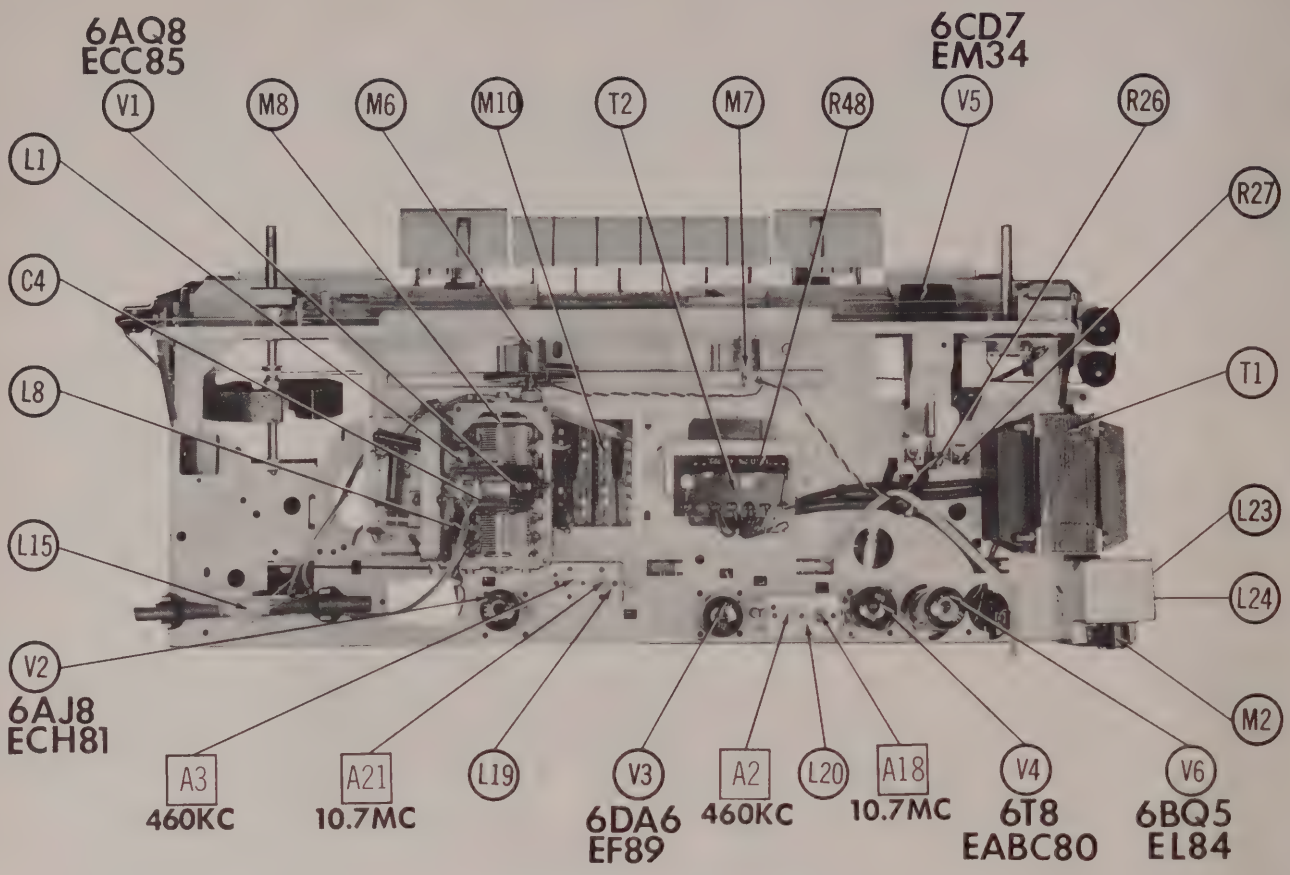
MODEL 7000

TRADE NAME	Grundig Majestic Models 7000, 7005, 7015	
SUPPLIER	Majestic International Sales Corp., 743 W. LaSalle St., Chicago 10, Illinois	
TYPE SET	AC Operated FM-BC-SW Receiver With 4 Speed Automatic Record Changer	
TUBES (Six)	Types 6AQ8/ECC85 FM RF Amp.-FM Conv., 6AJ8/ECH81 1st FM IF Amp.-AM Mixer-AM Osc., 6DA6/EF89 2nd FM-1st AM IF Amp., 6T8/EABC80 Ratio Det.-AM Det.-AVC-AF Amplifier, 6CD7/EM34-35 Tuning Indicator, 6BQ5/EL84 Output	
POWER SUPPLY	110-120 (or 220) Volts AC-60 Cycles	RATING .49 Amp. @ 117 Volts AC (48 Watts)
TUNING RANGE—BROADCAST	540KC-1620KC	SHORT WAVE I 5.9MC-13MC
FREQ. MOD.	88MC-108MC	SHORT WAVE II 12.9MC-23MC

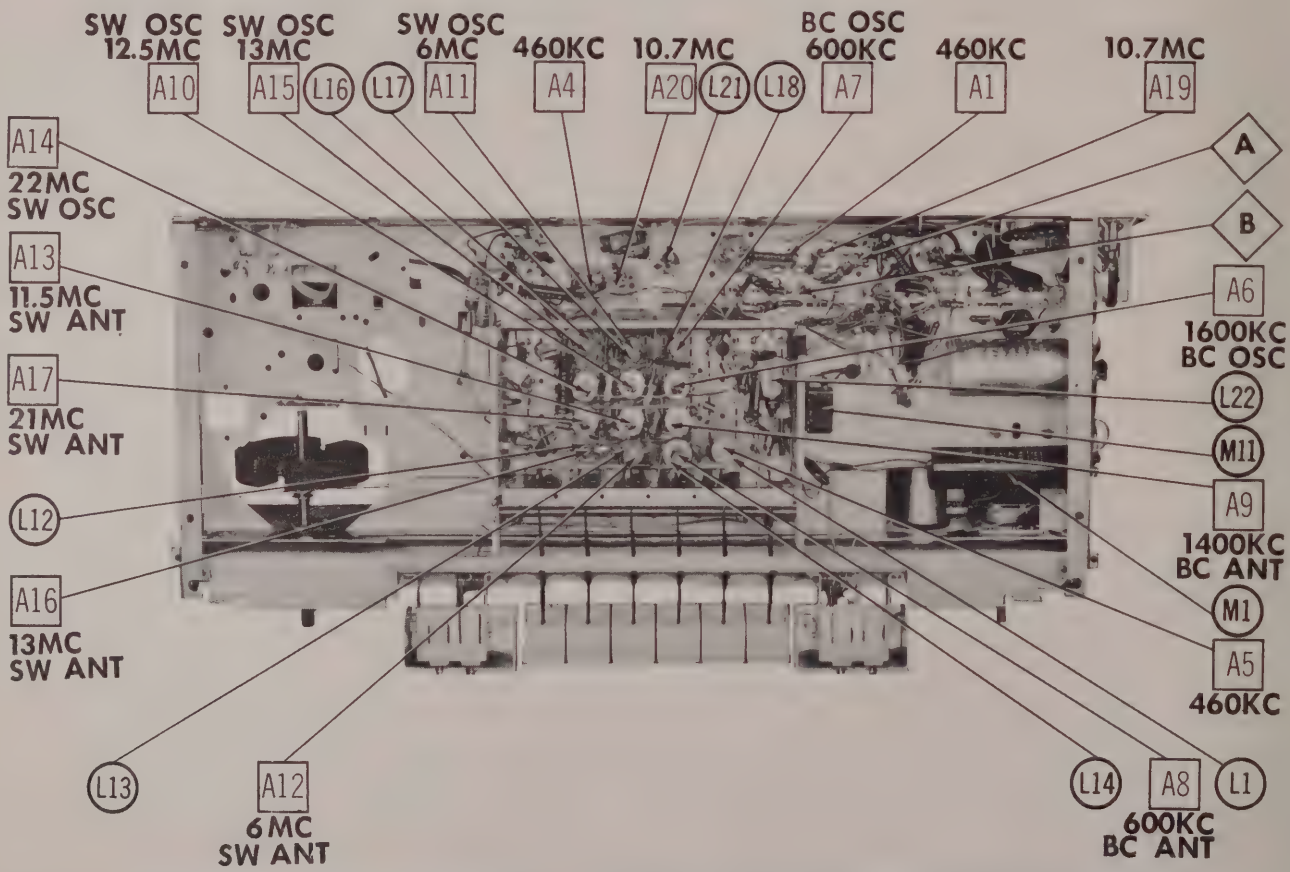
FOR SERVICE INFORMATION ON RECORD CHANGER - SEE SIMILAR MONARCH UA8 - PHOTOFACT SET 381 FOLDER 11

HOWARD W. SAMS & CO., INC. • Indianapolis 5, Indiana

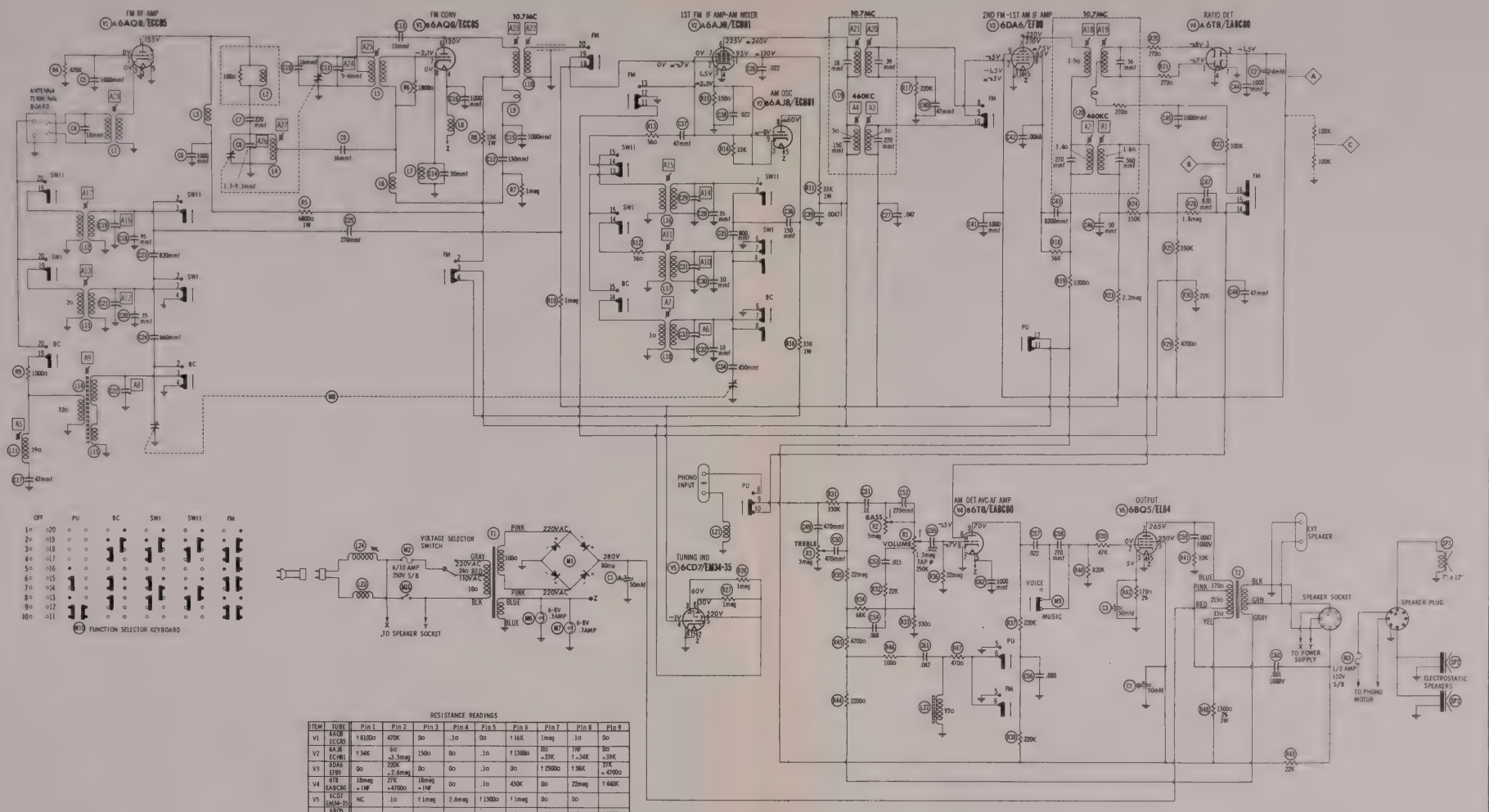
The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed. Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. © 1958 Howard W. Sams & Co., Inc., Indianapolis 5, Indiana. Printed in U.S. of America



CHASSIS - TOP VIEW



CHASSIS - BOTTOM VIEW - ALIGN, INDUCTOR & MISC IDENT.



RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	6AQ8 ECC85	†810Ω	470K	0Ω	.1Ω	0Ω	†16K	1meg	.1Ω	0Ω
V2	6AJ8 ECH81	†34K	6Ω *3.5meg	150Ω	0Ω	.1Ω	†1300Ω	0Ω =33K	INF †=34K	0Ω =33K
V3	6DA6 EF80	0Ω	220K *2.6meg	0Ω	0Ω	.1Ω	0Ω	†2300Ω	†98K	27K *4700Ω
V4	6T8 EABC80	18meg =INF	27K *4700Ω	18meg =INF	0Ω	.1Ω	430K	0Ω	22meg	†440K
V5	6CD7 EM34-35	NC	.1Ω	†1meg	2.6meg	†1300Ω	†1meg	0Ω	0Ω	
V6	6BQ5 EL84	NC	870K	170Ω	0Ω	.1Ω	NC	†385Ω	NC	†1300Ω

ALL MEASUREMENTS TAKEN IN "FM" POSITION UNLESS OTHERWISE DESIGNATED
† MEASURED FROM OUTPUT OF M1
* MEASURED IN "AM" POSITION
NC NO CONNECTION

● SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM

ARROWS ON CONTROLS INDICATE CLOCKWISE ROTATION (CONTROL VIEWED FROM SHAFT END)

1. DC voltage measurements taken with vacuum tube voltmeter, AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ±15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

A PHOTOFACT STANDARD NOTATION SCHEMATIC
©Howard W. Sams & Co., Inc. 1958

409-9

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

AM ALIGNMENT

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.01mfd	High side to pin 2 (grid) of 6AJ8/ECH81 (V2). Low side to chassis.	460KC (400~ Mod.)	BC	Tuning gang fully open	Across voice coil	A1, A2, A3, A4	Adjust for maximum deflection.
2.	"	High side to AM Antenna term. Low side to chassis.	"	"	"	"	A5	Adjust for MINIMUM deflection.
3.	"	"	1600KC	"	1600KC	"	A6	Adjust for maximum deflection.
4.	"	"	600KC	"	600KC	"	A7, A8	Adjust for maximum deflection. Repeat steps 3 and 4.
5.	"	"	1400KC	"	1400KC	"	A9	Adjust for maximum deflection.
6.	200mmf	"	12.5MC	SWI	12.5MC	"	A10	"
7.	"	"	6.0MC	"	6.0MC	"	A11, A12	Adjust for maximum deflection. Repeat steps 6 and 7.
8.	"	"	11.5MC	"	11.5MC	"	A13	Adjust for maximum deflection.
9.	"	"	22.0MC	SWII	22.0MC	"	A14	"
10.	"	"	13.0MC	"	13.0MC	"	A15, A16	Adjust for maximum deflection. Repeat steps 9 and 10.
11.	"	"	21.0MC	"	21.0MC	"	A17	Adjust for maximum deflection.

FM IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

Connect two matched 100K (±1%) resistors in series from point Ⓐ to chassis. The junction of these two resistors is alignment point Ⓒ as shown on the schematic.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
12.	200mmf	High side to pin 2 (grid) of 6DA6/EF89 (V3). Low side to chassis.	10.7MC (Unmod.)	FM	Point of non-interference	DC probe to point Ⓐ. Common to chassis.	A18	Adjust for maximum deflection.
13.	"	"	"	"	"	DC probe to point Ⓑ. Common to point Ⓒ.	A19	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting.
14.	"	High side to pin 2 (grid) of 6AQ8/ECC85 (V1). Low side to chassis.	"	"	"	DC probe to point Ⓐ. Common to chassis.	A20, A21 A22, A23	Adjust for maximum deflection.

FM IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Use frequency modulated signal with 60~ modulation and 450KC sweep. Use 120~ sawtooth voltage in scope for horizontal deflection.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT SCOPE	ADJUST	REMARKS
12.	200mmf	High side to pin 2 (grid) of 6DA6/EF89 (V3). Low side to chassis.	10.7MC (450KC Swp)	FM	Point of non-interference	Vert. Amp. to point Ⓐ. Low side to chassis.	A18	Disconnect stabilizing capacitor C2. Adjust for curve of maximum amplitude and symmetry similar to Fig. 1.
13.	"	"	"	"	"	Vert. Amp. to point Ⓑ. Low side to chassis.	A19	Reconnect C2. Adjust so that 10.7MC occurs at center of crossover lines similar to Fig. 2. SLIGHTLY retouch A18 for maximum amplitude and straightness of crossover lines.
14.	"	High side to pin 2 (grid) of 6AQ8/ECC85 (V1). Low side to chassis.	"	"	"	Vert. Amp. to point Ⓐ. Low side to chassis.	A20, A21 A22, A23	Disconnect C2. Adjust for curve of maximum amplitude and symmetry similar to Fig. 1. Reconnect C2.

FM RF ALIGNMENT

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
15.	270Ω Carbon Resistor	Across FM Antenna Leads with 270Ω in high side.	105MC	FM	105MC	DC probe to point Ⓐ. Common to chassis.	A24, A25	Adjust for maximum deflection.
16.	"	"	90MC	"	90MC	"	A26, A27 A28	Adjust for maximum deflection. Repeat steps 15 and 16.

FIG. 1

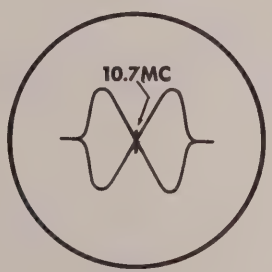


FIG. 2

PARTS LIST AND DESCRIPTIONS
TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE
V1	FM RF Amp. - FM Conv.	6AQ8/ECC85
V2	1st FM IF Amp. - AM Mixer - AM Oscillator	6AJ8/ECH81
V3	2nd FM - 1st AM IF Amp.	6DA6/EF89
V4	Ratio Det. - AM Det. - AVC - AF Amplifier	6T8/EABC80
V5	Tuning Indicator	6CD7/EM34-35
V6	Output	6BQ5/EL84

ELECTROLYTIC CAPACITORS

ITEM No.	RATING CAP.	RATING VOLT.	REPLACEMENT DATA Grundig Majestic PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1A	50	385					TMS-58	S-275	R2582 *
B	50	385					TD-50-450	MT-4550	
C2	4	80		PRS150V4	BBR4-150	TC40	TD-4-150	MT-1504	TVA-1402
C3	50	15		PRS25V50	BBR50-25	TC29	TD-50-25	MT-0250	TVA-1206

* Non Catalog Item

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING CAP.	RATING VOLT	REPLACEMENT DATA Grundig Majestic PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C4	18			SI 18	D6-180	LT6Q18	UC-5418	5GA-Q18	
C5	1000			BPD-001	DD-102	BYA6D1	DC521	5HK-D1	
C6	1000			BPD-001	DD-102	BYA6D1	DC521	5HK-D1	
C7	220			BPD-00022	DD-221	L10T22	UC-5322	5GA-T22	
C8	1.3-9.3								
C9	36								
C10	16								
C11	.5-4								
C12	130								
C13	15			SI 15	D6-150	LT6Q15	UC-5415	5GA-Q15	
C14	30			SI 30	D6-300	LT6Q3	UC-543	5GA-Q3	
C15	1000			BPD-001	DD-102	BYA6D1	DC521	5HK-D1	
C16	1000			BPD-001	DD-102	BYA6D1	DC521	5HK-D1	
C17	47			1468-000047	D6-470	5W5Q47	UC-5447	1FM-447	
C18	95								
C19									
C20	35								
C21									
C22									
C23	820			1467-00082	DD-821	1W5T82		1FM-382	
C24	660								
C25	270								
C26	.022	500		P688N-022	DD-203	CUB6S22	GEM-6122	6TM-S22	
C27	.047	500		P688N-047	DF-503	CUB6S47	GEM-6147	6TM-S47	
C28	35								
C29									
C30	10			SI 10	D6-100	LT6Q1	UC-541	5GA-Q1	
C31									
C32	10			SI 10	D6-100	LT6Q1	UC-541	5GA-Q1	
C33									
C34	450								
C35	800			1467-0008	D6-801	1W5T8		1FM-38	
C36	150			SI 150	D6-151	LT6T15	UC-5315	5GA-T15	
C37	47			1468-000047	D6-470	5W5Q47	UC-5447	1FM-447	
C38	.022	250		P488N-022	DD-203	CUB4S22	GEM-4122	4TM-S22	
C39	.0047	500		P688N-0047	D6-472	CUB6D47	GEM-6247	6TM-D47	
C40	47			SI 47	D6-470	LT6Q47	UC-5447	5GA-Q47	
C41	1000			BPD-001	DD-102	BYA6D1	DC521	5HK-D1	
C42	.0068	500		P688N-0068	D6-682	CUB6D68	GEM-6268	6TM-D68	
C43	8200								
C44	1000			BPD-001	DD-102	BYA6D1	DC521	5HK-D1	
C45	1000			BPD-001	DD-102	BYA6D1	DC521	5HK-D1	
C46	100			1468-0001	DD-101	5W5T1	MC235	1FM-31	
C47	820			1467-00082	DD-821	1W5T82		1FM-382	
C48	47			1468-000047	DD-470	5W5Q47	UC-5447	1FM-447	
C49	470			1468-00047	D6-471	1W5T47	UC-5347	1FM-347	
C50	470			1468-00047	D6-471	1W5T47	UC-5347	1FM-347	
C51	.01	125		P288N-01	D6-103	CUB2S1	GEM-411	2TM-S1	
C52	270			1468-00027	D6-271	5W5T27	UC-5327	1FM-327	

PARTS LIST AND DESCRIPTIONS (Continued)
SPEAKER

ITEM No.	TYPE SIZE	TYPE FIELD	TYPE V. C. IMP.	REPLACEMENT DATA Grundig Majestic PART No.	REPLACEMENT DATA QUAM PART No.	NOTES
SP1	7" X 12"	PM	2-4Ω	7046-001		
SP2	3" X 3"	Electrostatic		7082-002		
SP3	3" X 3"	Electrostatic		7082-002		

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA Grundig Majestic PART No.	Meissner PART No.	Merit PART No.	Miller PART No.	Ram PART No.	NOTES
L1	FM Ant. Trans.	HFBV1974/1					
L2	RF Choke	HFBV1956/1					
L3	RF Choke	HFBV1975/1	19-1001	BC-562	4604		Wound on 100Ω
L4	FM RF Coil	9208-025					1.5 Microhenry
L5	FM Osc. Coil	9208-024					
L6	RF Choke	HFBV1976/1					
L7	Cathode Choke	HFBV1950/1	19-1000	BC-561	4602		2.85 Microhenries
L8	Fil. Choke	9238-026	19-1001	BC-562	4604		1.25 Microhenry
L9	1st FM IF Primary	HFBV1977/1					1.5 Microhenry
L10A	Coupling Coil	HFBV1978/1					
B	1st FM IF Secondary						
L11	IF Trap Coil	9208-055					
L12	SW Ant. Trans.	9232-005					
L13	SW Ant. Trans.	9231-003					
L14	BC Ant. Trans.	HFBV1711					
L15	Loop Stick	1075-038					
L16	SW Osc. Coil	9232-006					
L17	SW Osc. Coil	9231-002					
L18	BC Osc. Coil	HFBV1681					
L19A	2nd FM IF	7207-325					
B	1st AM IF						
L20A	Ratio Det.	7207-317					
B	2nd AM IF						
L21	RF Choke	HFBV2149/1	19-1000	BC-561	4602		1.2 Microhenry
L22	Tone Choke	9217-009					
L23	Line Choke	9227-004					
L24	Line Choke	9227-005					

RECTIFIERS

ITEM No.	RATING CURRENT (Measured)	REPLACEMENT DATA Grundig Majestic PART No.	FEDERAL PART No.	INTERNATIONAL PART No.	SARKES TARZIAN PART No.	NOTES
M1	.08IA	B250C75N2 ①		61-4037 ①	D-64 ②	① Selenium Type ② Silicon Type

FUSES

ITEM No.	TYPE	RATING	REPLACEMENT DATA Grundig Majestic PART No. FUSE	Grundig Majestic PART No. HOLDER	LITTELFUSE PART No. FUSE	LITTELFUSE PART No. HOLDER	BUSS PART No. FUSE	BUSS PART No. HOLDER
M2	Slo-Blo	0.6A 250V		9625-057				
M3	Slo-Blo	0.5A 110V		101				

PHONO CARTRIDGE

ITEM No.	REPLACEMENT DATA Grundig Majestic PART No.	ASTATIC PART No. CARTRIDGE	ASTATIC PART No. NEEDLE	ELECTRO-VOICE PART No. CARTRIDGE	ELECTRO-VOICE PART No. MOUNT	REMARKS
M4		55T or 81-TB	GD-J	56	PT-2	

ASTATIC NEEDLE LISTING SHOWN ABOVE IS SPECIFIED FOR THE RESPECTIVE REPLACEMENT CARTRIDGE LISTED. FOR ORIGINAL CARTRIDGE NEEDLE REPLACEMENTS SEE BELOW.

PARTS LIST AND DESCRIPTIONS (Continued)

CAPACITORS (cont)

ITEM No.	RATING CAP.	RATING VOLT	REPLACEMENT DATA Grundig Majestic PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C53	.015	250		P488N-015	DD16-153	CUB4S15	GEM-6115	4TM-S15	
C54	.068	125		P288N-068		CUB6S68	GEM-6168	6TM-S68	
C55	.022	125		P288N-022	DD-203	CUB4S22	GEM-4122	4TM-S22	
C56	.068	500		P688N-068		CUB6S68	GEM-6168	6TM-S68	
C57	.022	500		P688N-022	DD-203	CUB6S22	GEM-6122	6TM-S22	
C58	270			1468-00027	D6-271	5W5T27	UC-5327	1FM-327	
C59	.0047	1000		P1088N-0047		CUB10D47	GEM-10247	10TM-D47	
C60	.001	1000		P1088N-001	DD-102	CUB10D1	GEM-1021	10TM-D1	
C61	.047	125		P288N-047	DF-503	CUB2S47	GEM-2147	2TM-S47	
C62	1000			BPD-001	DD-102	BYA6D1	DC521	5HK-D1	

CONTROLS

ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA Grundig Majestic PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
R1	1.3meg	½	7801-038					Volume, Tap @ 250K
R2	5meg	½	7806-182					Bass
R3	5meg	½	7806-180					Treble

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING OHMS	RATING WATT	Grundig Majestic PART No.	NOTES
R4	470K			
R5	6800Ω	1		
R6	1800Ω			
R7	1meg			
R8	15K	1		
R9	1000Ω			
R10	1meg			
R11	33K	1		
R12	56Ω			
R13	56Ω			
R14	33K			
R15	150Ω			
R16	33K	1		
R17	220K			
R18	56K			
R19	1000Ω			
R20	270Ω			
R21	270Ω			
R22	100K			
R23	2.2meg			
R24	150K			
R25	330K			
R26	1meg			

ITEM No.	RATING OHMS	RATING WATT	Grundig Majestic PART No.	NOTES
R27	1meg			
R28	1.8meg			
R29	4700Ω			
R30	22K			
R31	330K			
R32	22K			
R33	330Ω			
R34	68K			
R35	22meg			
R36	22meg			
R37	220K			
R38	220K			
R39	47K			
R40	820K			
R41	10K			
R42	170Ω 2%			
R43	22K			
R44	2200Ω			
R45	4700Ω			
R46	100Ω			
R47	470Ω			
R48	1300Ω 2%	3		

TRANSFORMER (POWER)

ITEM No.	RATING PRI.	RATING SEC. 1	RATING SEC. 2	REPLACEMENT DATA Grundig Majestic PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T1	220V Tap @ 117V @ .49A	220V @ .080A	6.3V @ 2.7A	9078-024						

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE PRI.	IMPEDANCE SEC.	REPLACEMENT DATA Grundig Majestic PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	NOTES
T2	5300Ω Tap @ 5000Ω 1500Ω	3Ω Tap @ .5Ω	9066-047							

PARTS LIST AND DESCRIPTIONS (Continued)

PHONO NEEDLE

(FOR REPLACEMENT IN ORIGINAL EQUIPMENT CARTRIDGE)

ITEM No.	REPLACEMENT DATA Grundig Majestic PART No.	JENSEN PART No.	WALCO PART No.	REMARKS
M5		† S-66 or †♦S-66SD or ♦ S-66D	† W75TPS or †♦W75DS or ♦ W75TPD	† Jewel ♦ Diamond

MISCELLANEOUS

ITEM No.	PART NAME	Grundig Majestic PART No.	NOTES
M6	Lamp		6-8V .3A
M7	Lamp		6-8V .3A
M8	Tuning Cap.	9653-407	Four Gang (AM Sections: Ant. 9-557mmf, Osc. 11-412mmf)
M9	Switch	7612-011	Tone Control, Pushbutton Ass'y with Two Slide Switches
M10	Switch	7416-001	Pressbutton Block With Coil Set
M11	Switch	7404-548	Power On-Off (Toggle Type)

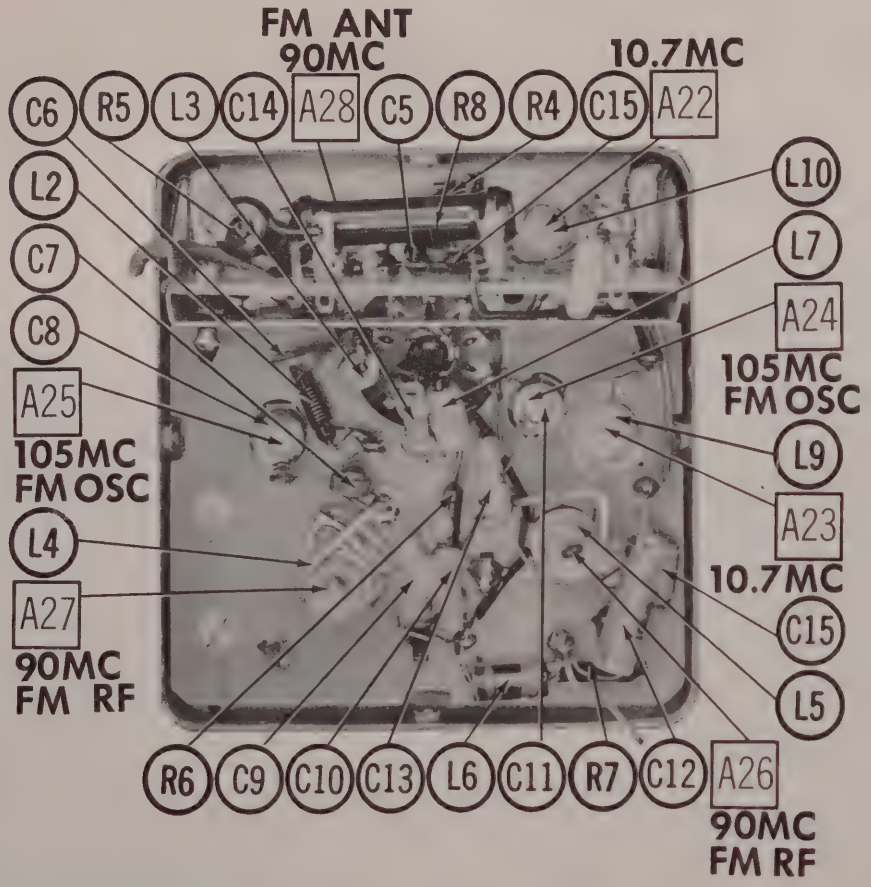
CABINETS & CABINET PARTS

(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

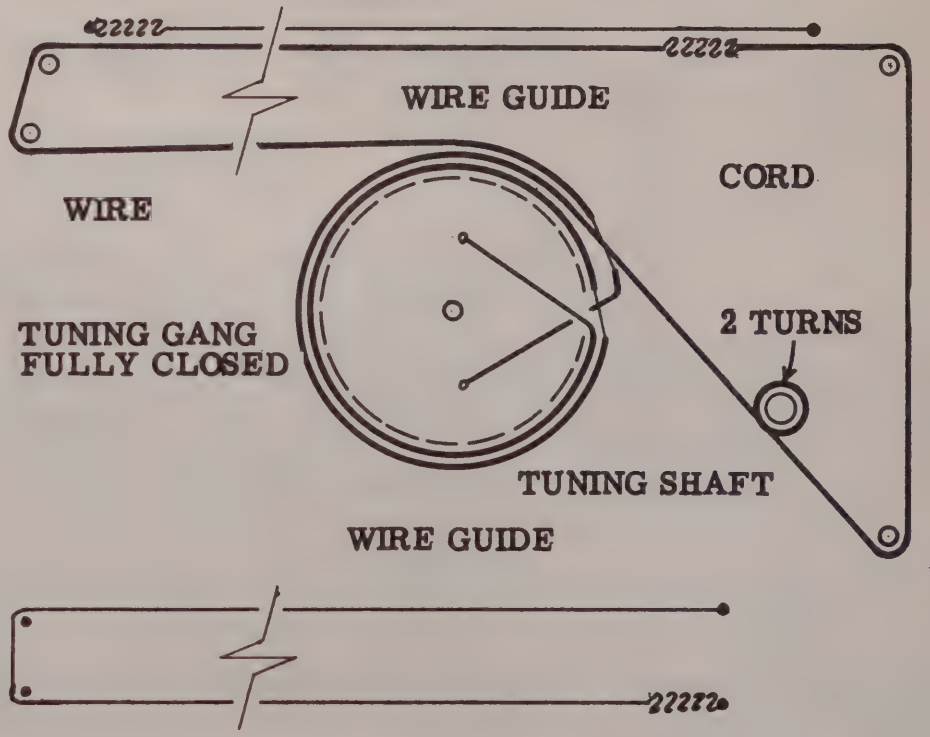
NAME	PART NO.	DESCRIPTION
Knob	9616-536	Small, Upper Part (Two used)
Knob	9616-532	Large, Lower Part (Two used)
Leg	2043-004	Four used, Model 7015
Cabinet	2042-111	Model 7000
Cabinet	2043-111	Model 7015
Pointer	1035-096	
Dial Scale	2042-115	Model 7000
Dial Scale	2043-115	Model 7015
Pressbutton	7404-501	Six required

WIRING DATA

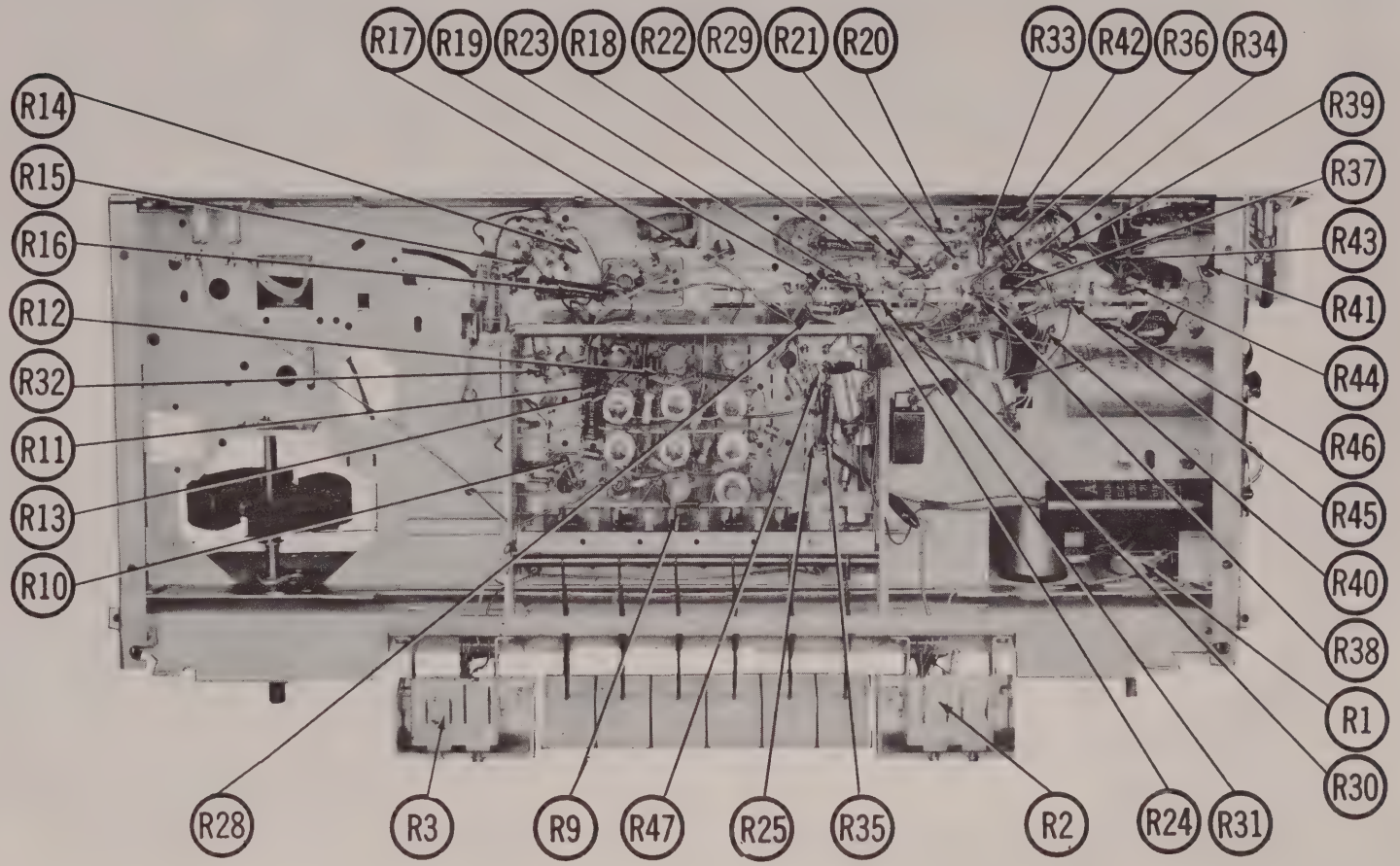
General-use Unshielded Hook-up Wire ..... Use BELDEN No. 8530 (Solid) Available in Ten Colors
8524 (Stranded) Available in Ten Colors
Power Cord ..... Use BELDEN No. 1765-B (6 Ft. Length)
1725-K (7½ Ft. Length)
Low-Loss Shielded Lead (Interconnecting) ..... Use BELDEN No. 8401
Phono Pick-up Arm Cable ..... Use BELDEN No. 8430 (Two Conductor - Twisted)



FM RF SUB-CHASSIS

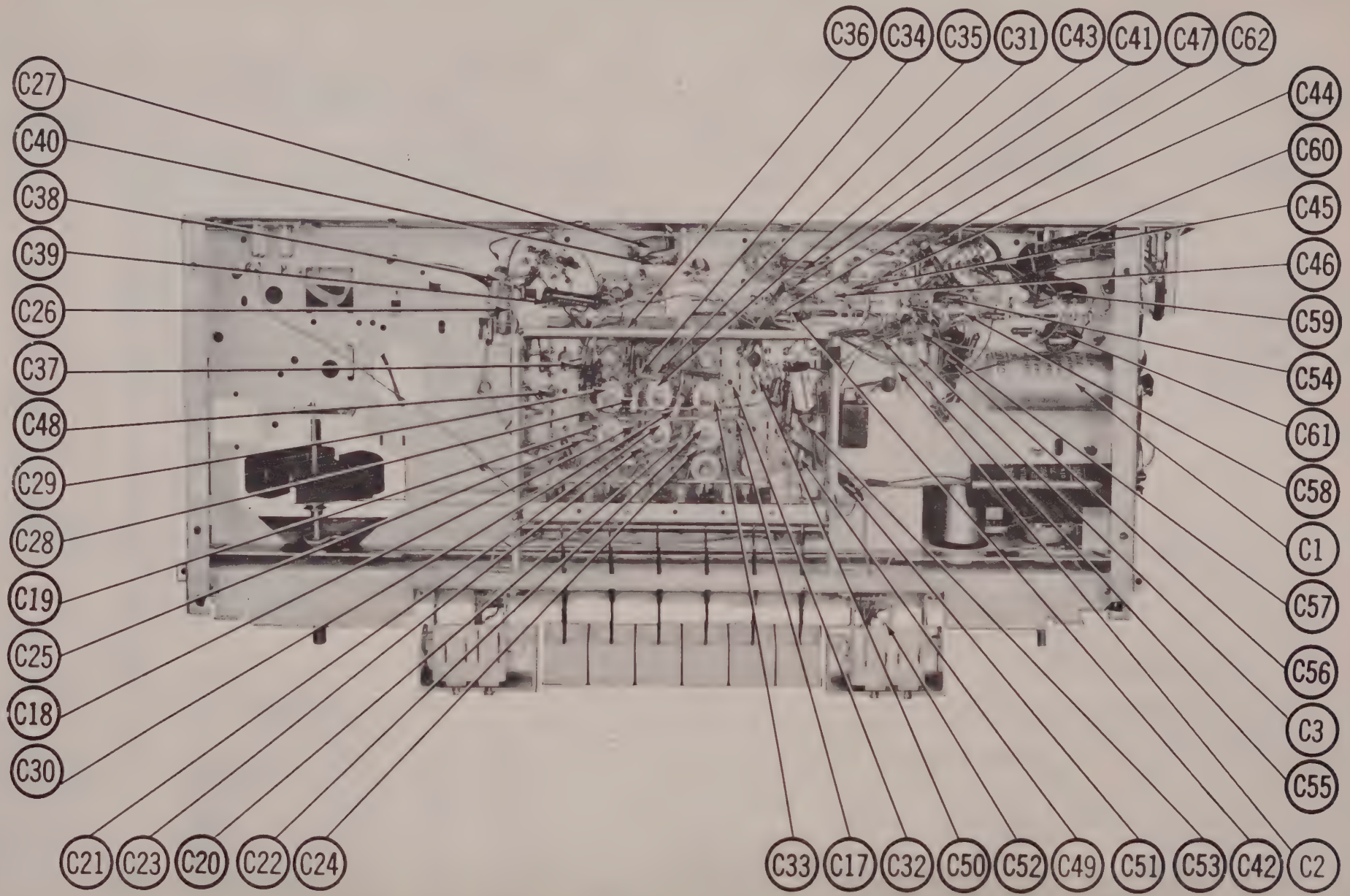


DIAL CORD STRINGING



CHASSIS BOTTOM VIEW-RESISTOR IDENTIFICATION

GRUNDIG MAJESTIC
MODEL 7000



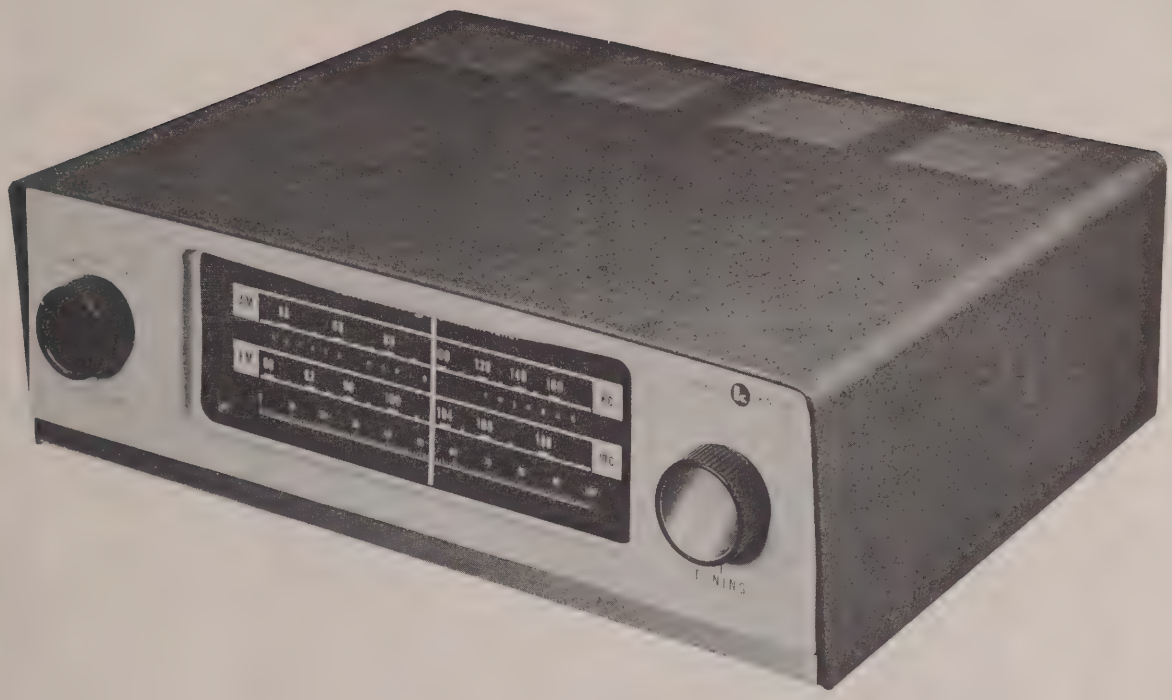
CHASSIS BOTTOM VIEW-CAPACITOR IDENTIFICATION

PHOTOFACT* Folder

EIA MEMBER ELECTRONIC INDUSTRIES ASSOCIATION

KNIGHT MODEL KN-100 (92SX401)

KNIGHT MODEL
KN-100 (92SX401)



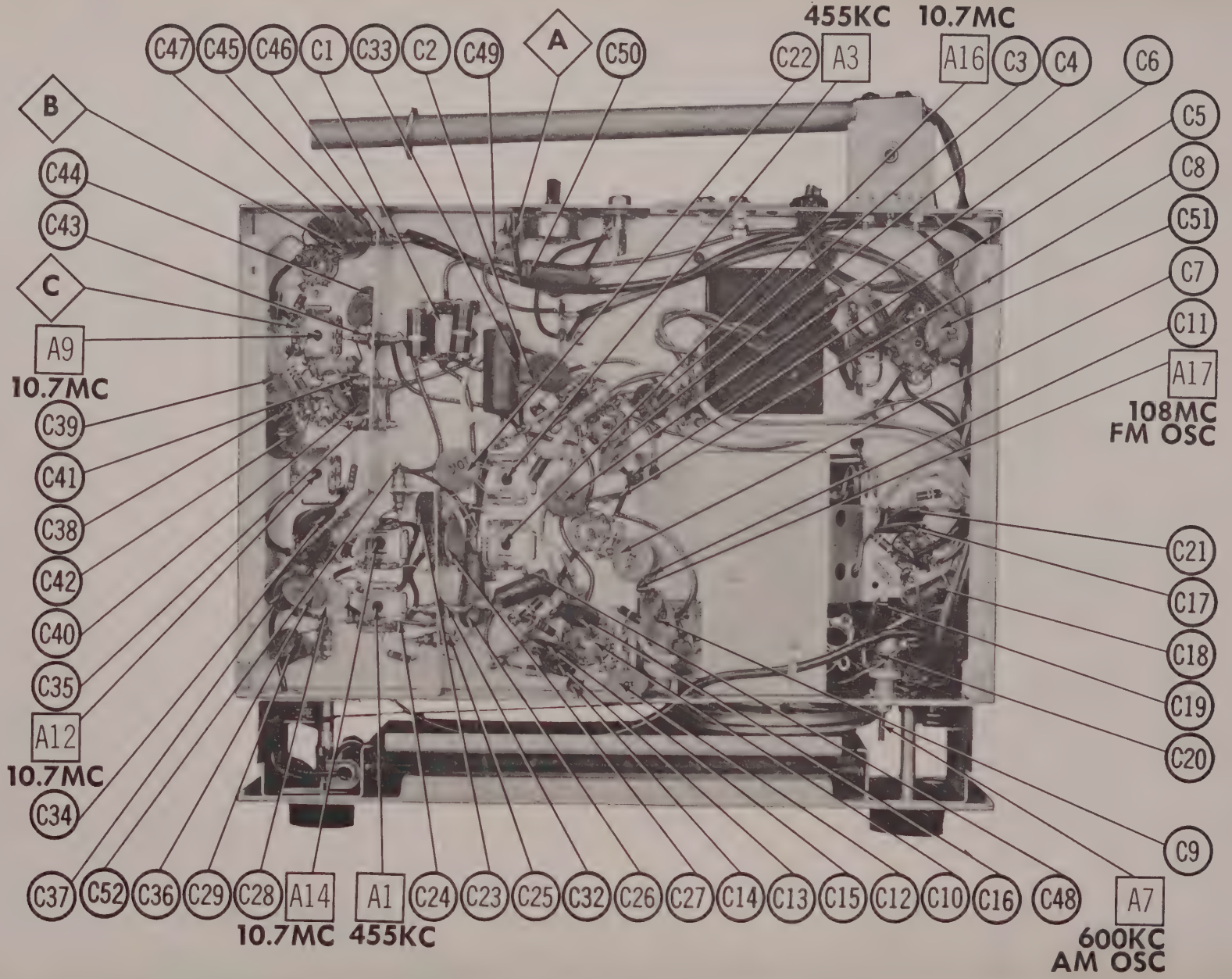
KNIGHT MODEL
KN-100 (92SX401)

TRADE NAME	Knight Model KN-100 (92SX401)		
SUPPLIER	Allied Radio Corp., 100 N. Western Ave., Chicago 80, Illinois		
TYPE SET	AC Operated FM-AM Tuner		
TUBES (Nine)	Types 6CB6 FM RF Amplifier, 6AB4 FM Mixer, 12AT7 FM Osc.-FM AFC, 6BE6 AM Converter, 6CB6 1st FM-AM IF Amp., 6CB6 2nd FM IF Amp.-AM Det.-AVC, 6AU6 FM Limiter, 6AL5 Discr., 6X4 Rectifier		
POWER SUPPLY	110-120 Volts AC-50/60 Cycles	RATING	.375 Amp. @ 117 Volts AC (37 Watts)
TUNING RANGE-BROADCAST	540-1600KC	FREQ. MOD.	88-108MC

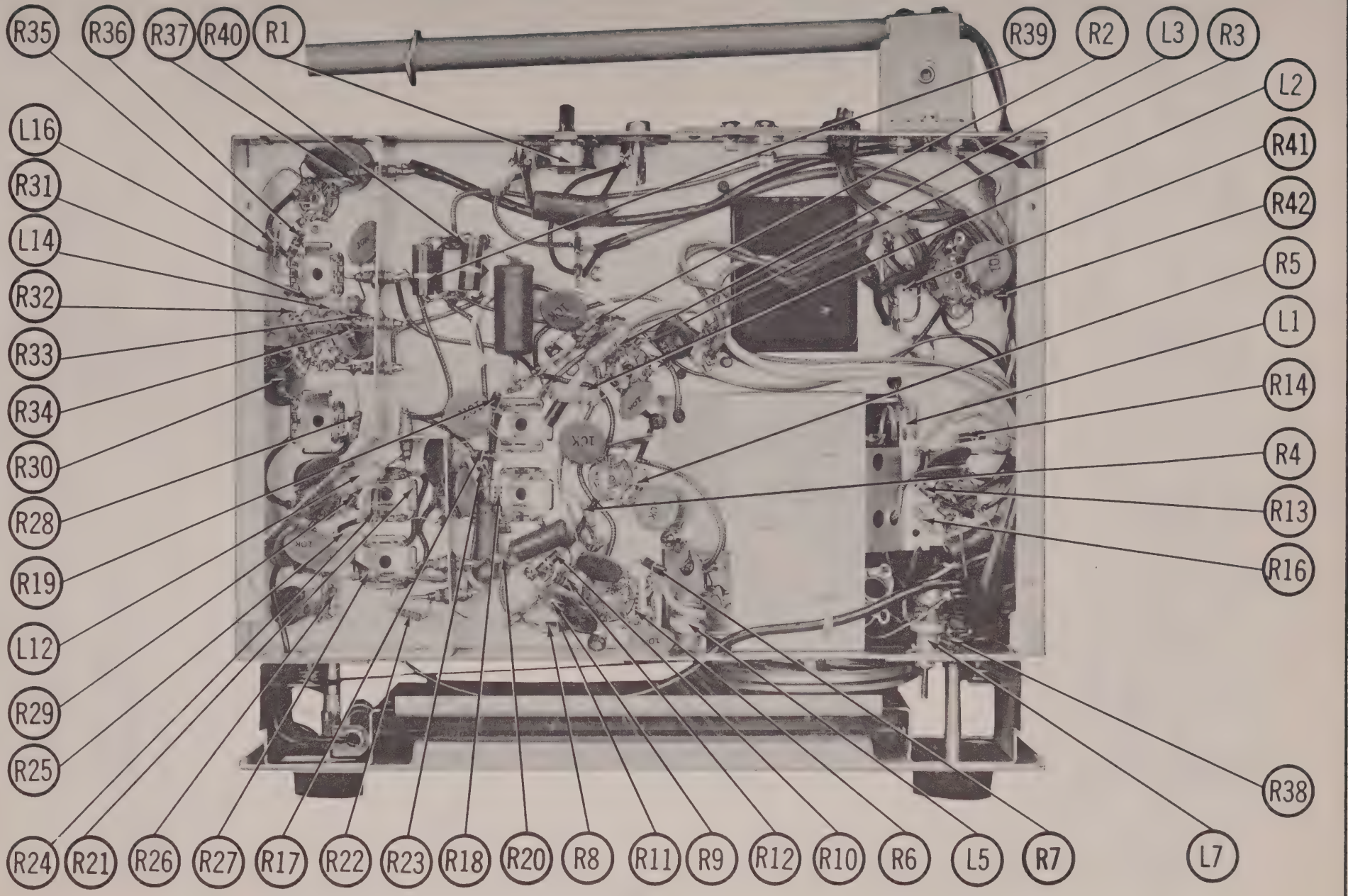
HOWARD W. SAMS & CO., INC. • Indianapolis 5, Indiana

The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed. Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. © 1958 Howard W. Sams & Co., Inc., Indianapolis 5, Indiana. Printed in U.S. of America

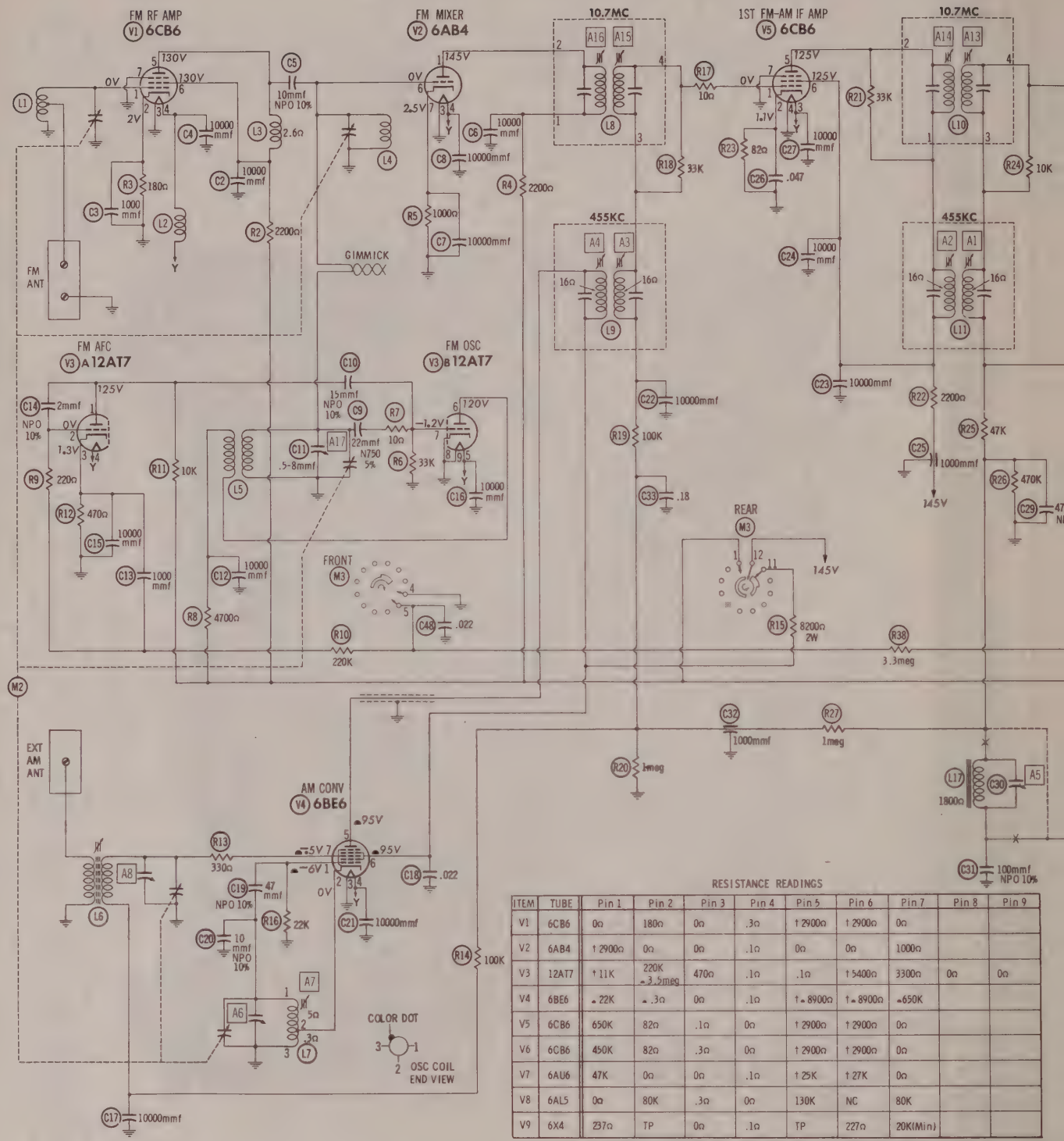
H501



CHASSIS BOTTOM VIEW-CAPACITOR AND ALIGNMENT IDENTIFICATION



CHASSIS BOTTOM VIEW-RESISTOR AND INDUCTOR IDENTIFICATION



RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	6CB6	0Ω	180Ω	0Ω	.3Ω	↑2900Ω	↑2900Ω	0Ω		
V2	6AB4	↑2900Ω	0Ω	0Ω	.1Ω	0Ω	0Ω	1000Ω		
V3	12AT7	↑11K	220K ▰3.5meg	470Ω	.1Ω	.1Ω	↑5400Ω	3300Ω	0Ω	0Ω
V4	6BE6	▰22K	▰.3Ω	0Ω	.1Ω	↑▰8900Ω	↑▰8900Ω	▰650K		
V5	6CB6	650K	82Ω	.1Ω	0Ω	↑2900Ω	↑2900Ω	0Ω		
V6	6CB6	450K	82Ω	.3Ω	0Ω	↑2900Ω	↑2900Ω	0Ω		
V7	6AU6	47K	0Ω	0Ω	.1Ω	↑25K	↑27K	0Ω		
V8	6AL5	0Ω	80K	.3Ω	0Ω	130K	NC	80K		
V9	6X4	237Ω	TP	0Ω	.1Ω	TP	227Ω	20K(Min)		

ALL MEASUREMENTS TAKEN IN "FM" POSITION UNLESS OTHERWISE DESIGNATED
↑ MEASURED FROM PIN 7 OF V9
▰ MEASURED IN "AM" POSITION
NC NO CONNECTION
TP TIE POINT

Θ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

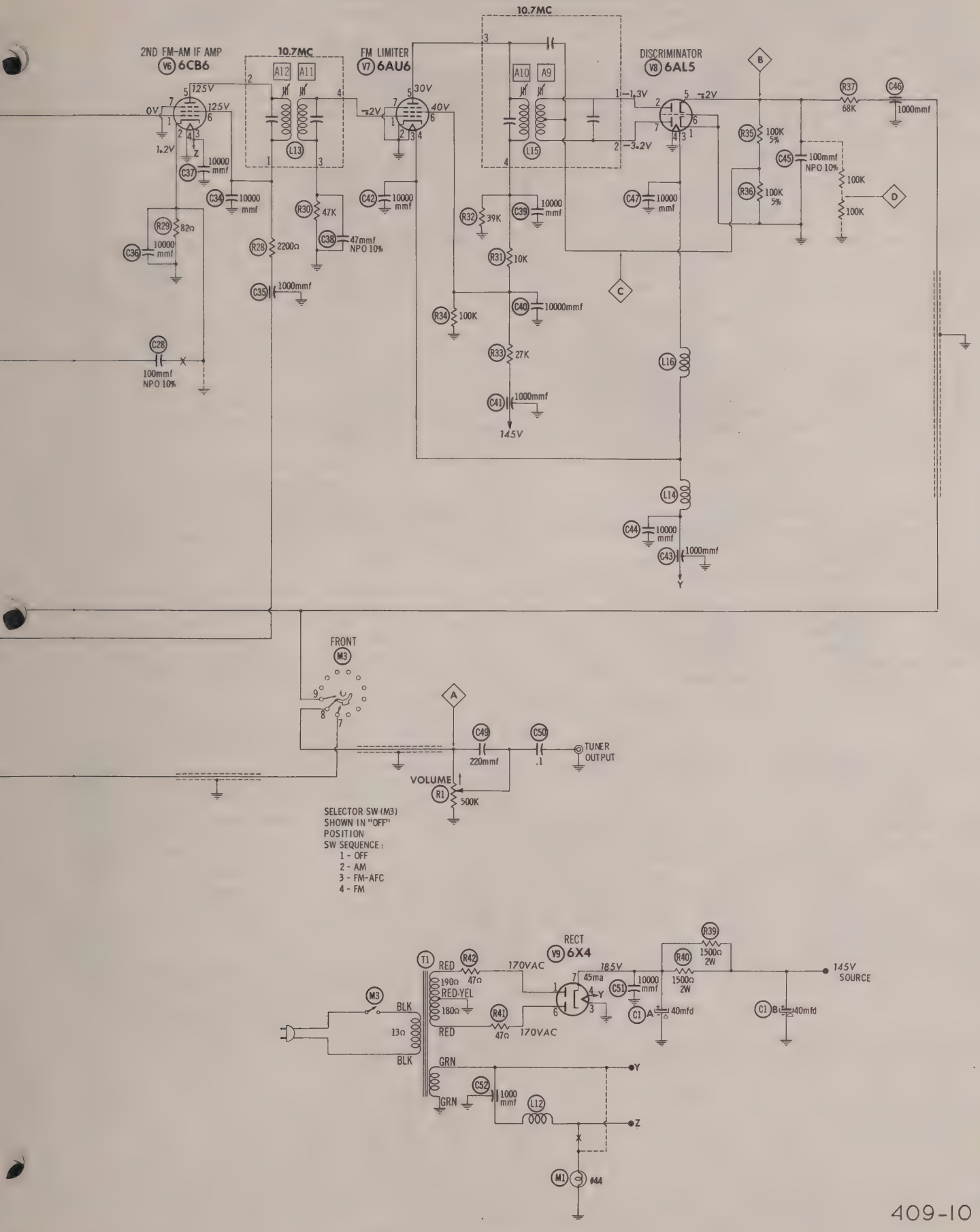
DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM

ARROWS ON CONTROLS INDICATE CLOCKWISE ROTATION (CONTROL VIEWED FROM SHAFT END)

1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ±15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

A PHOTOFACT STANDARD NOTATION SCHEMATIC

© Howard W. Sams & Co., Inc. 1958



KNIGHT
MODEL KN-100 (92SX401)

FOLDER 10

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

AM ALIGNMENT

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
1.	.01mfd	High side to AM antenna stator lug of tuning gang. Low side to chassis.	455KC (400∿ Mod)	AM	Tuning gang fully open	DC probe to point Ⓐ. Common to chassis.	A1, A2, A3, A4	Adjust for maximum deflection.
2.	"	"	455KC (10KC Mod)	"	"	"	A5	Adjust for MINIMUM deflection.
3.		Loop	1600KC (400∿ Mod)	"	1600KC	"	A6	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
4.		"	600KC	"	600KC	"	A7	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output. Repeat steps 3 and 4.
5.		"	1500KC	"	1500KC	"	A8	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.

FM IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
6.	.01mfd	High side to pin 1 (grid) of 6AU6 (V7). Low side to chassis.	10.7MC (Unmod)	FM	Point of non-interference	DC probe to point Ⓑ. Common to chassis.	A9	Adjust for maximum deflection.
7.	"	"	"	"	"	DC probe to point Ⓒ. Common to chassis.	A10	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting.
8.	"	High side to pin 6 (grid) of 6AB4 (V2). Low side to chassis.	"	"	"	DC probe to point Ⓑ. Common to chassis.	A11, A12, A13, A14, A15, A16	Adjust for maximum deflection.

FM IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Use frequency modulated signal with 60∿ modulation and 450KC sweep. Use 120∿ sawtooth voltage in scope for horizontal deflection.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT SCOPE	ADJUST	REMARKS
6.	.01mfd	High side to pin 1 (grid) of 6AU6 (V7). Low side to chassis.	10.7MC (450KC Swp)	FM	Point of non-interference	Vert. Amp. to point Ⓑ. Low side to chassis.	A9	Adjust for curve of maximum amplitude and symmetry similar to Fig. 1.
7.	"	"	"	"	"	Vert. Amp. to point Ⓒ. Low side to chassis.	A10	Adjust so that 10.7MC occurs at center of crossover lines similar to Fig. 2. SLIGHTLY retouch A9 for maximum amplitude and straightness of crossover lines.
8.	"	High side to pin 6 (grid) of 6AB4 (V2). Low side to chassis.	"	"	"	Vert. Amp. to point Ⓑ. Low side to chassis.	A11, A12, A13, A14, A15, A16	Adjust for curve of maximum amplitude and symmetry similar to Fig. 1.

FM RF ALIGNMENT

Step 11 is not necessary unless tuner fails to track properly.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
9.	270Ω Carbon Resistor	High side thru 270Ω to FM Antenna terminal. Low side to chassis.	108MC (Unmod)	FM	108MC	DC probe to point Ⓑ. Common to chassis.	A17	Adjust for maximum deflection.
10.	"	"	88MC	"	88MC	"	L4, L1	Adjust L4, L1 by compressing or expanding coil turns for maximum deflection.
11.	"	"	106MC	"	106MC	"		Adjust for maximum deflection by bending FM RF and antenna rotor plates of tuning gang.

FIG. 1

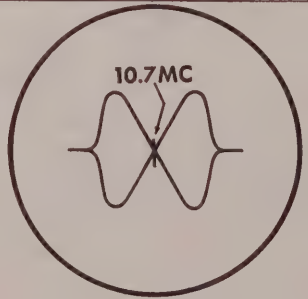


FIG. 2

PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V1	FM RF Amplifier	6CB6	
V2	FM Mixer	6AB4	
V3	FM Osc. - FM AFC	12AT7	
V4	AM Converter	6BE6	
V5	1st FM-AM IF Amplifier	6CB6	
V6	2nd FM IF Amplifier-AM Det. - AVC	6CB6	
V7	FM Limiter	6AU6	
V8	Discriminator	6AL5	
V9	Rectifier	6X4	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING CAP.	RATING VOLT.	KNIGHT PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1A	▲40	300		AFH4-01-80	D0016	FP217. 87			R2654 *
B	▲40	300							

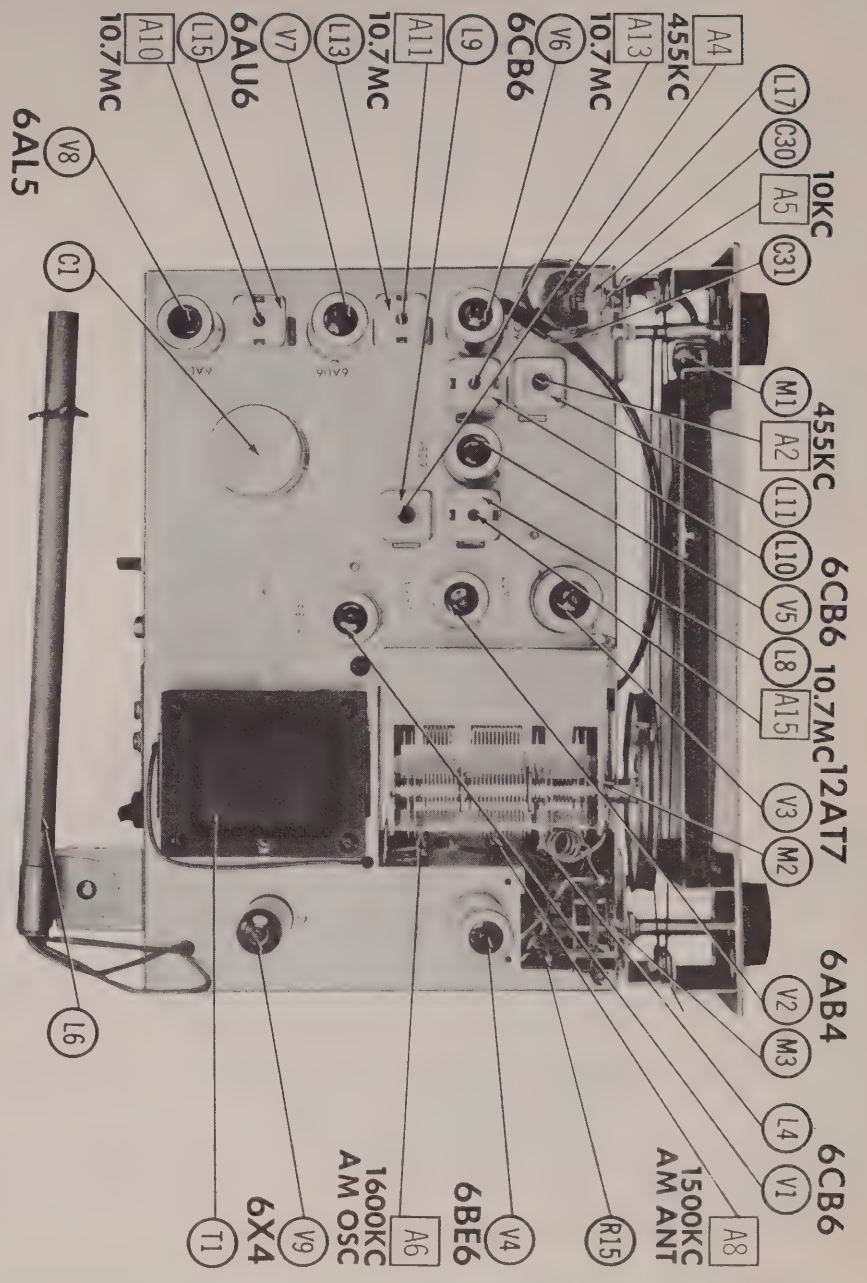
* Non-Catalog Item

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING CAP.	RATING VOLT	KNIGHT PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C2	10000			BPD-01	DD-103	BYA10S1	DC511	5HK-S1	
C3	1000			BPD-001	DD-102	BYA6D1	DC521	5HK-D1	
C4	10000			BPD-01	DD-103	BYA10S1	DC511	5HK-S1	
C5	10			NPO-DI 10	DTZ-10	C10Q1C	ZT-541	5TCC-Q1	NPO 10%
C6	10000			BPD-01	DD-103	BYA10S1	DC511	5HK-S1	
C7	10000			BPD-01	DD-103	BYA10S1	DC511	5HK-S1	
C8	10000			BPD-01	DD-103	BYA10S1	DC511	5HK-S1	
C9	22				DTN-22				N750 5%
C10	15			NPO-DI 15	DTZ-15	C10Q15C		5TCC-Q15	NPO 10%
C11	. 5-8								
C12	10000			BPD-01	DD-103	BYA10S1	DC511	5HK-S1	
C13	1000			BPD-001	DD-102	BYA6D1	DC521	5HK-D1	
C14	2								NPO 10%
C15	10000			BPD-01	DD-103	BYA10S1	DC511	5HK-S1	
C16	10000			BPD-01	DD-103	BYA10S1	DC511	5HK-S1	
C17	10000			BPD-01	DD-103	BYA10S1	DC511	5HK-S1	
C18	. 022	200		P288N-022	DD-203	CUB4S22	GEM-4122	2TM-S22	
C19	47			NPO-DI 47	DTZ-47	C10Q47C		5TCC-Q47	NPO 10%
C20	10			NPO-DI 10	DTZ-10	C10Q1C	ZT-541	5TCC-Q1	NPO 10%
C21	10000			BPD-01	DD-103	BYA10S1	DC511	5HK-S1	
C22	10000			BPD-01	DD-103	BYA10S1	DC511	5HK-S1	
C23	10000			BPD-01	DD-103	BYA10S1	DC511	5HK-S1	
C24	10000			BPD-01	DD-103	BYA10S1	DC511	5HK-S1	
C25	1000			EF-001	MFT-1000			503C-D1	
C26	. 047	200		P288N-047	DF-503	CUB2S47	GEM-4147	2TM-S47	
C27	10000			BPD-01	DD-103	BYA10S1	DC511	5HK-S1	
C28	100			NPO-DI 100	DTZ-100	C10T1C	ZT-531	5TCC-T1	NPO 10%
C29	47			NPO-DI 47	DTZ-47	C10Q47C		5TCC-Q47	NPO 10%
C30									
C31	100			NPO-DI 100	DTZ-100	C10T1C	ZT-531	5TCC-T1	NPO 10%
C32	1000			EF-001	MFT-1000			503C-D1	
C33	. 18	200							
C34	10000			BPD-01	DD-103	BYA10S1	DC511	5HK-S1	
C35	1000			EF-001	MFT-1000			503C-D1	
C36	10000			BPD-01	DD-103	BYA10S1	DC511	5HK-S1	
C37	10000			BPD-01	DD-103	BYA10S1	DC511	5HK-S1	
C38	47			NPO-DI 47	DTZ-47	C10Q47C		5TCC-Q47	NPO 10%
C39	10000			BPD-01	DD-103	BYA10S1	DC511	5HK-S1	
C40	10000			BPD-01	DD-103	BYA10S1	DC511	5HK-S1	
C41	1000			EF-001	MFT-1000			503C-D1	
C42	10000			BPD-01	DD-103	BYA10S1	DC511	5HK-S1	
C43	1000			EF-001	MFT-1000			503C-D1	
C44	10000			BPD-01	DD-103	BYA10S1	DC511	5HK-S1	
C45	100			NPO-DI 100	DTZ-100	C10T1C	ZT-531	5TCC-T1	NPO 10%
C46	1000			EF-001	MFT-1000			503C-D1	
C47	10000			BPD-01	DD-103	BYA10S1	DC511	5HK-S1	
C48	. 022	200		P288N-022	DD-203	CUB4S22	GEM-4122	2TM-S22	
C49	220			DI 220	DD-221	L10T22	UC-5322	5GA-T22	
C50	. 1	200		P288N-1	DF-104	CUB2P1	GEM-201	2TM-P1	
C51	10000			BPD-01	DD-103	BYA10S1	DC511	5HK-S1	
C52	1000			EF-001	MFT-1000			503C-D1	

CHASSIS—TOP VIEW



KNIGHT
MODEL KN-100 (92SX401)

PARTS LIST AND DESCRIPTIONS (Continued)

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	KNIGHT PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	
R1A B	500K Shaft	½	RP-504AF-B	AB-60 * AK-1	A47-500K-Z* FKS-1/4	B11-133 TM2-Kit	TA55A Not Req.	Volume

* Enlarge mounting hole to 3/8" diameter.

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING		KNIGHT PART No.	NOTES
	OHMS	WATT		
R2	2200Ω			
R3	180Ω			
R4	2200Ω			
R5	1000Ω			
R6	33K			
R7	10Ω			
R8	4700Ω			
R9	220Ω			
R10	220K			
R11	10K			
R12	470Ω			
R13	330Ω			
R14	100K			
R15	8200Ω	2		
R16	22K			
R17	10Ω			
R18	33K			
R19	100K			
R20	1meg			
R21	33K			
R22	2200Ω			

ITEM No.	RATING		KNIGHT PART No.	NOTES
	OHMS	WATT		
R23	82Ω			
R24	10K			
R25	47K			
R26	470K			
R27	1meg			
R28	2200Ω			
R29	82Ω			
R30	47K			
R31	10K			
R32	39K			
R33	27K			
R34	100K			
R35	100K 5%			
R36	100K 5%			
R37	68K			
R38	3.3meg			
R39	1500Ω	2		
R40	1500Ω	2		
R41	47Ω			
R42	47Ω			

TRANSFORMER (POWER)

ITEM No.	RATING			REPLACEMENT DATA						
	PRI.	SEC. 1	SEC. 2	KNIGHT PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T1	117V @ .38A	355VCT @ .043A	6.3V @ 2.9A	LP-0245						

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA					NOTES
		KNIGHT PART No.	Meissner PART No.	Merit PART No.	Miller PART No.	Ram PART No.	
L1	FM Antenna Coil	LL-0061					
L2	Fil. Choke		19-1007	BC-560	4590		.68 Microhenry ①
L3	RF Choke						3.3 Microhenries ①
L4	FM RF Coil	LL-0060					
L5	FM Osc. Coil	LL-0062					
L6	Loop Stick	LW-0109					
L7	AM Osc. Coil	LL-0059			70-Osc.*		* Disregard primary
L8	1st FM IF	LR-0032	16-3487	FM-254	1463		
L9	1st AM IF	LR-0041	16-6770	BC-352	12-C1	RF-1	
L10	2nd FM IF	LR-0033	16-3487	FM-254	1463		
L11	2nd AM IF	LR-0041	16-6770	BC-353	12-C2	RF-2	
L12	Fil. Choke		19-1007	BC-560	4590		.68 Microhenry ①
L13	3rd FM IF	LR-0033	16-3487	FM-254	1463		
L14	Fil. Choke		19-1007	BC-560	4590		.68 Microhenry ①
L15	Discriminator	LQ-0179	17-3494	FM-253	1464		
L16	Fil. Choke		19-1007	BC-560	4590		.68 Microhenry ①

① IRC Part #CLA.

PARTS LIST AND DESCRIPTIONS (Continued)

FILTER CHOKE

ITEM No.	RATINGS			REPLACEMENT DATA						
	CURRENT (Measured)	DC RES.	INDUCTANCE (0 CURRENT 1000 ∿)	KNIGHT PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
L17		1800Ω	2.7 Hys.	LC-0232						

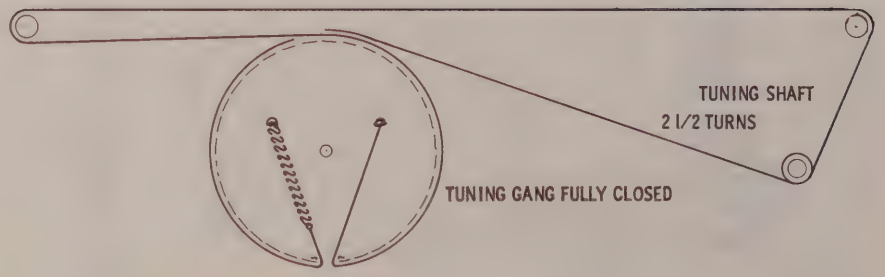
MISCELLANEOUS

ITEM No.	PART NAME	KNIGHT PART No.	NOTES
M1	Lamp		#44
M2	Tuning Cap.		AM-FM (AM Sections: Ant. 12-432mmf, Osc. 8-152mmf)
M3	Switch	X-0312-B	Function (Four position, Single section, Rotary wafer)

WIRING DATA

General-use Unshielded Hook-up Wire ..... Use BELDEN No. 8530 (Solid) Available in Ten Colors
8524 (Stranded) Available in Ten Colors

Power Cord ..... Use BELDEN No. 1765-B (6 Ft. Length)
1725-K (7½ Ft. Length)



DIAL CORD STRINGING

PHOTOFACT* Folder

EIA MEMBER ELECTRONIC INDUSTRIES ASSOCIATION

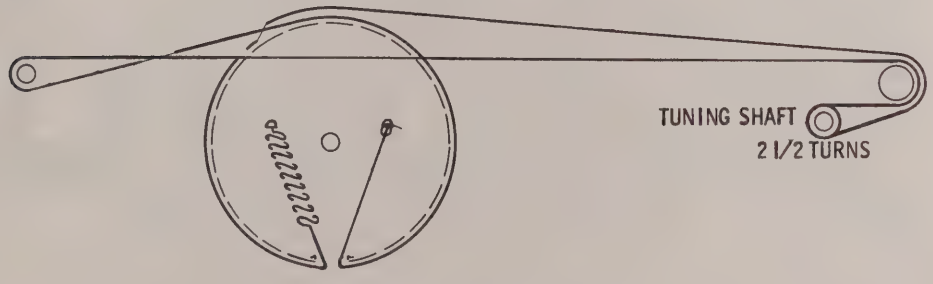
KNIGHT MODEL KN-110 (92SX403)

KNIGHT MODEL KN-110 (92SX403)

KNIGHT MODEL KN-110 (92SX403)

TRADE NAME	Knight Model KN-110 (92SX403)	
SUPPLIER	Allied Radio Corp., 100N. Western Ave., Chicago 80, Illinois	
TYPE SET	AC Operated FM-AM Tuner	
TUBES	Twelve	
POWER SUPPLY	105-125 Volts AC-60 Cycles	RATING .5 Amp. @117 Volts AC (47 Watts)
TUNING RANGE—BROADCAST 540-1620KC		FRED. MOD. 88-108MC

FM AM DIAL CORD
TUNING GANG FULLY CLOSED



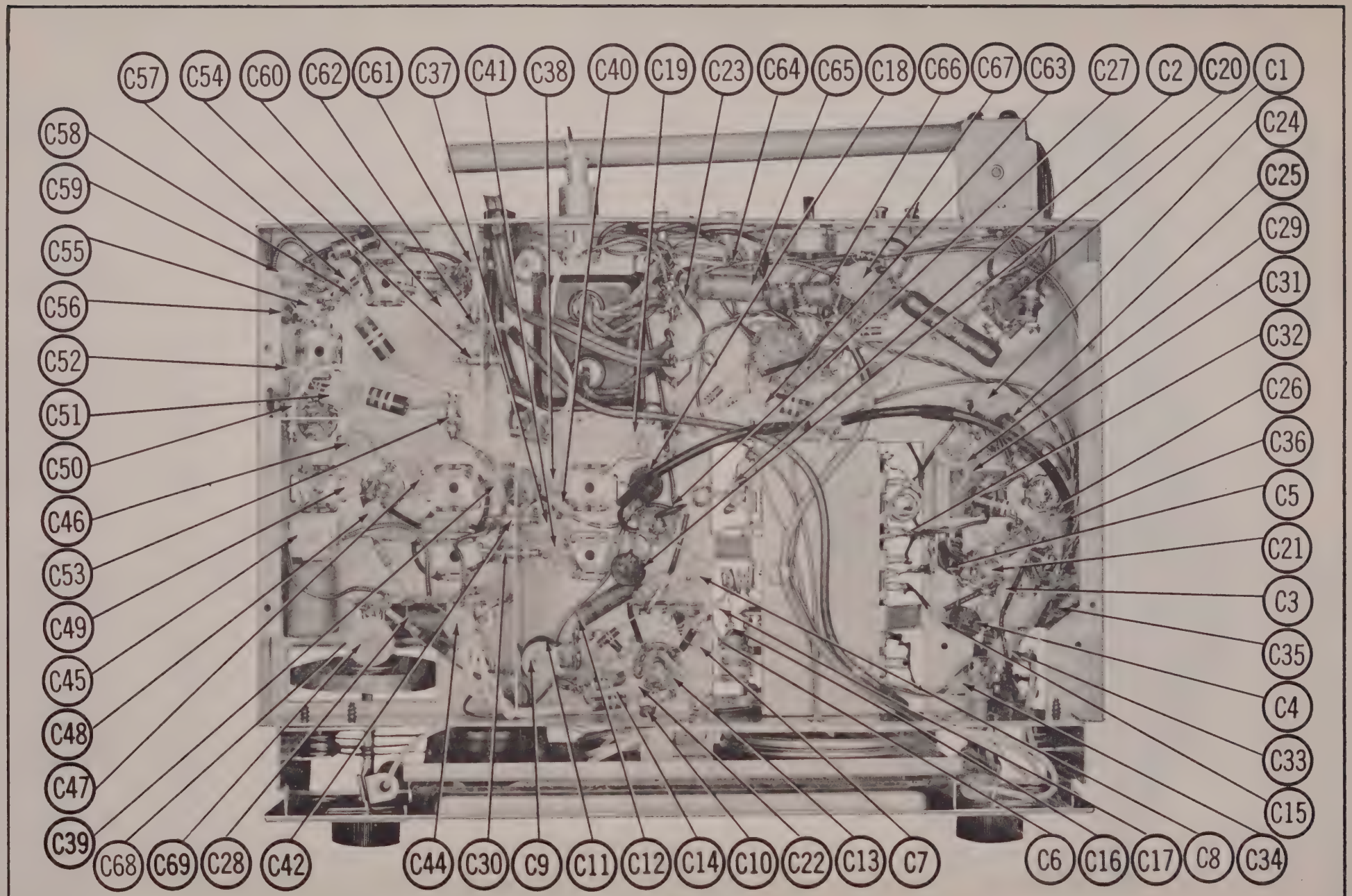
DIAL CORD STRINGING

HOWARD W. SAMS & CO., INC. • Indianapolis 5, Indiana

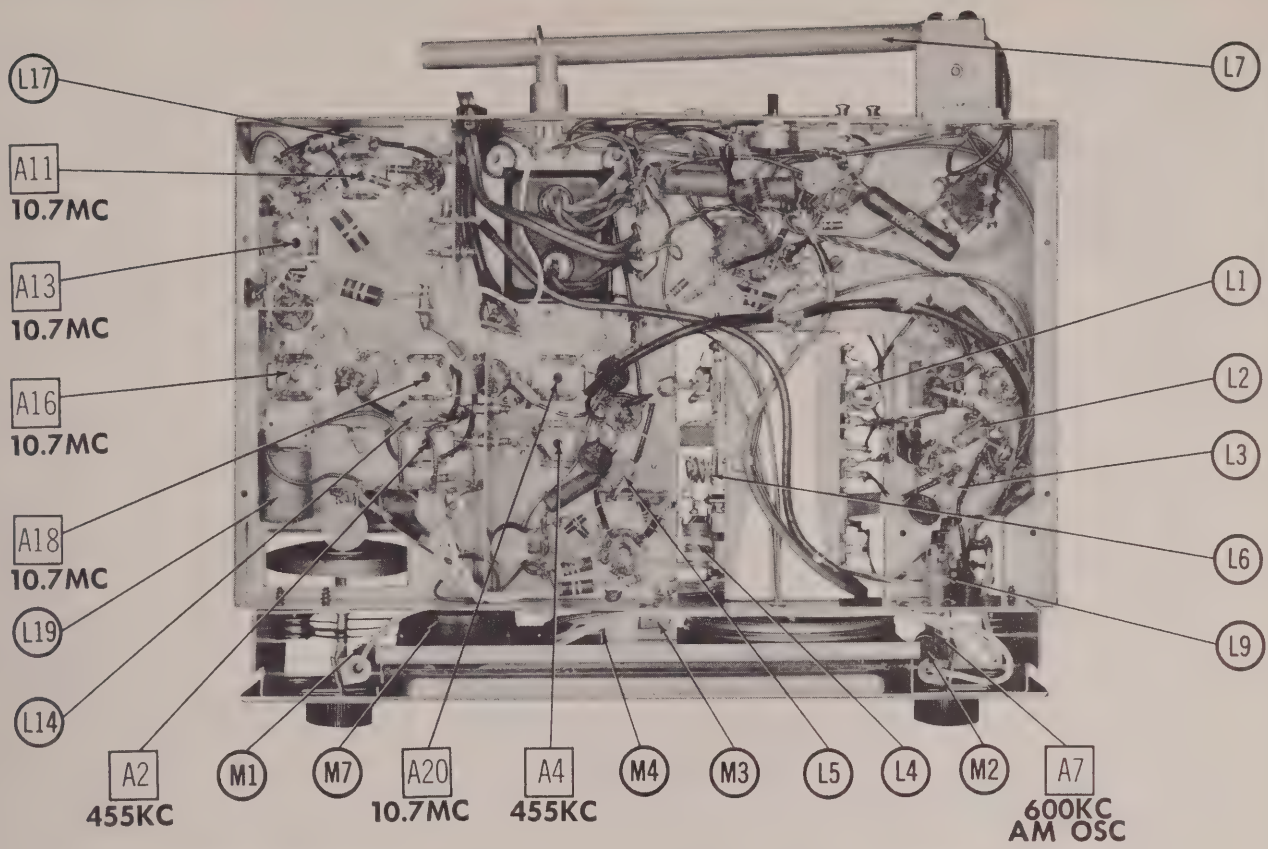
The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed. Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. © 1958 Howard W. Sams & Co., Inc., Indianapolis 5, Indiana. Printed in U.S. of America

H452

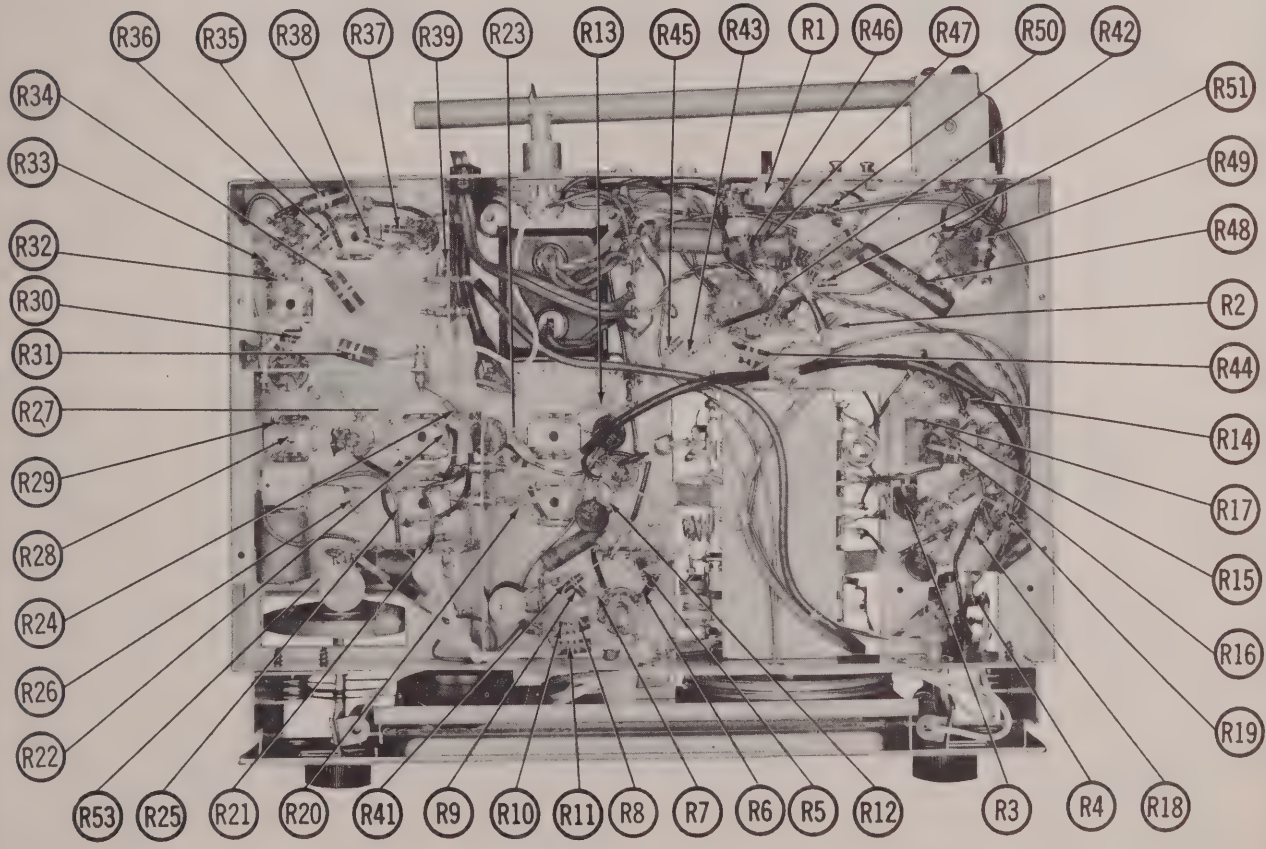
SET 409 FOLDER 11



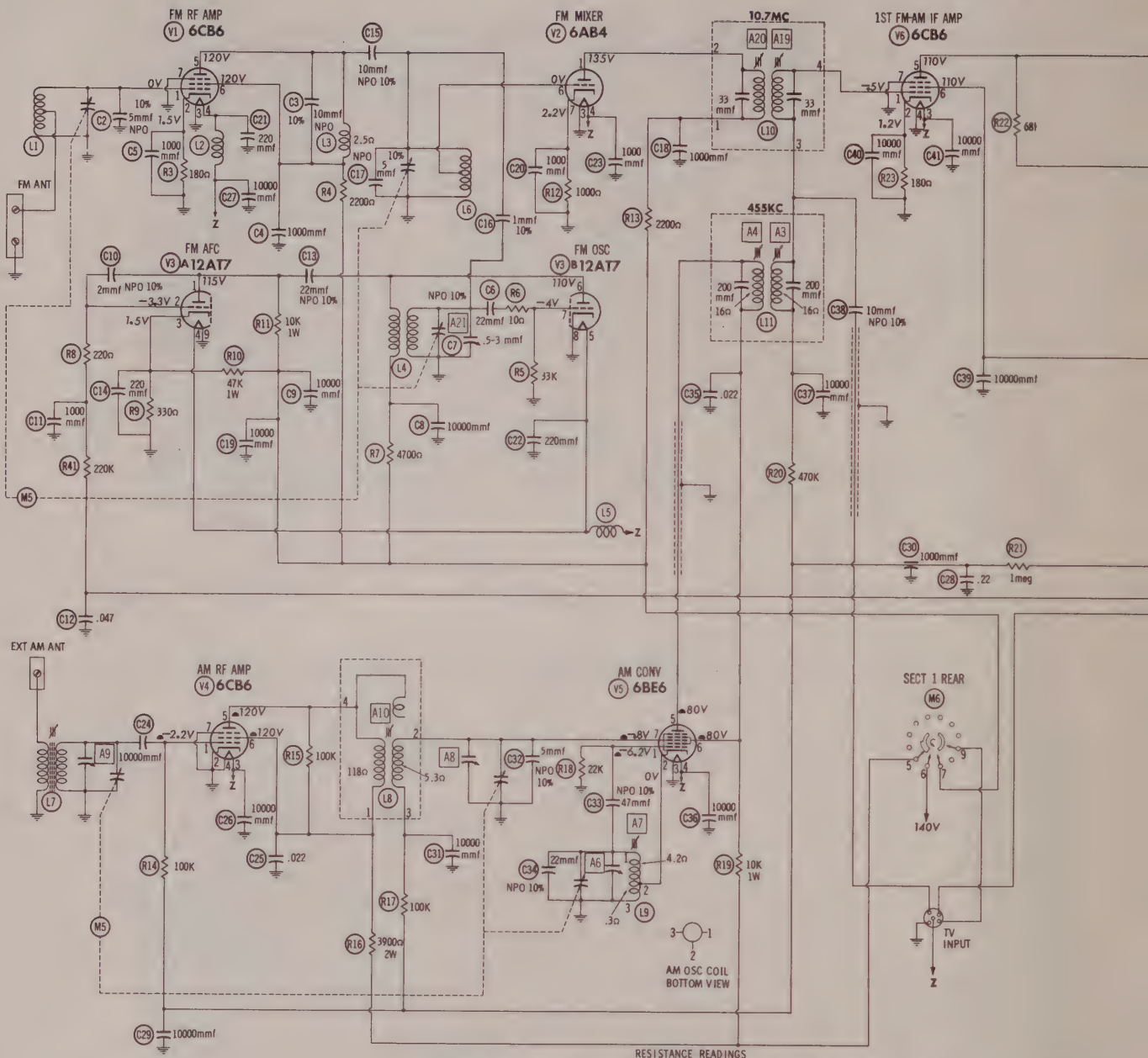
CHASSIS BOTTOM VIEW-CAPACITOR IDENTIFICATION



CHASSIS BOTTOM VIEW-ALIGN, INDUCTOR & MISC. IDENT.



CHASSIS BOTTOM VIEW-RESISTOR IDENTIFICATION



RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	6CB6	0Ω	180Ω	0Ω	.3Ω	†3700Ω	†3700Ω	0Ω		
V2	6AB4	†3700Ω	0Ω	0Ω	.1Ω	0Ω	0Ω	1000Ω		
V3	12AT7	†11K	3.8meg	330Ω	.2Ω	.2Ω	†6200Ω	33K	0Ω	0Ω
V4	6CB6	▪1.4meg	0Ω	.1Ω	0Ω	†▪5400Ω	†▪5400Ω	0Ω		
V5	6BE6	▪22K	▪.3Ω	0Ω	.1Ω	†▪11K	†▪11K	▪1.4meg		
V6	6CB6	1.4meg 1.7meg	180Ω	.1Ω	0Ω	†6200Ω	†6200Ω	0Ω		
V7	6CB6	47K ▪400K	180Ω	.2Ω	0Ω	†6200Ω	†6200Ω	0Ω		
V8	6AU6	100K	0Ω	0Ω	.1Ω	†48K	†48K	0Ω		
V9	6AU6	100K	0Ω	0Ω	.1Ω	†17 K	†16K	0Ω		
V10	6AL5	0Ω	100K	0Ω	.1Ω	200K	0Ω	100K		
V11	12AU7	†1500Ω	490K	25K	0Ω	0Ω	†500Ω	650 K	300Ω	.1Ω
V12	6X4	157Ω	TP	0Ω	.1Ω	TP	167Ω	20K(MIN)		

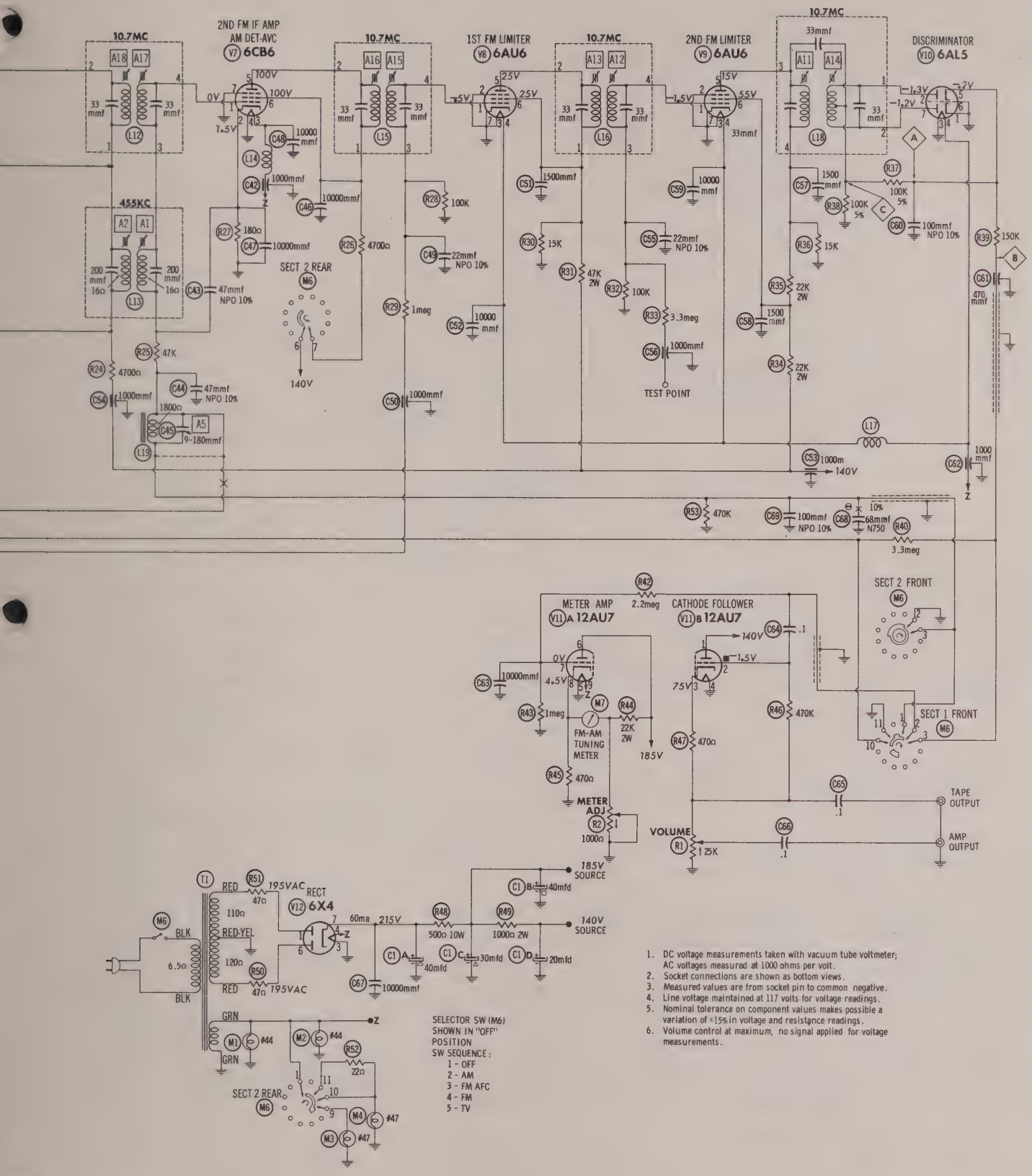
ALL MEASUREMENTS TAKEN IN "FM" POSITION UNLESS OTHERWISE DESIGNATED
† MEASURED FROM PIN 7 OF V12
▪ MEASURED IN "AM" POSITION
■ MEASURED FROM PIN 3 OF V11
TP TIE POINT

Θ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM

ARROWS ON CONTROLS INDICATE CLOCKWISE ROTATION (CONTROL VIEWED FROM SHAFT END)

A PHOTOFACT STANDARD NOTATION SCHEMATIC
Howard W. Sams & Co., Inc. 1958



1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ±15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

409-11

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

AM ALIGNMENT

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
1.	.1mfd	High side to pin 7 (grid) of 6BE6 (V5). Low side to chassis.	455KC (400∿ Mod)	AM	Point of non-interference.	AC probe to amplifier output jack Common to chassis.	A1, A2, A3, A4,	Adjust for maximum deflection.
2.	"	"	455KC (10KC Mod)	"	"	"	A5	Adjust for MINIMUM deflection
3.		Loop	1600KC (400∿ Mod)	"	1600KC	"	A6	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
4.		"	600KC	"	Tune for 600KC signal.	"	A7	"
5.		"	1500KC	"	1500KC	"	A8, A9	"
6.		"	600KC	"	600KC	"	A10	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output. Repeat steps 3, 4, 5, and 6.

FM IF ALIGNMENT USING AM SIGNAL GENERATOR AND VTVM

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
7.	.01mfd.	High side to pin 1 (grid) of 6AU6 (V8). Low side to chassis.	10.7MC (Unmod.)	FM	Point of non-interference.	DC probe to point Ⓒ. Common to chassis.	A11, A12, A13	Adjust for maximum deflection.
8.	"	"	"	"	"	DC probe to point Ⓑ. Common to chassis.	A14	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting.
9.	"	High side to FM RF stator lug of tuning gang. Low side to chassis.	"	"	"	DC probe to point Ⓒ. Common to chassis.	A15, A16 A17, A18 A19, A20	Adjust for maximum deflection.

FM IF ALIGNMENT USING FM SIGNAL GENERATOR AND OSCILLOSCOPE

Use frequency modulated signal with 60∿ modulation and 450KC sweep. Use 120∿ sawtooth voltage in scope for horizontal deflection.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT SCOPE	ADJUST	REMARKS
7.	.01mfd.	High side to pin 1 (grid) of 6AU6(V8). Low side to chassis.	10.7MC (450KC. SWP)	FM	Point of non-interference	Vert. Amp. thru 27K to point Ⓒ. Low side to chassis.	A11, A12 A13	Adjust for curve of maximum amplitude and symmetry similar to Fig. 1
8.	"	"	"	"	"	Vert. Amp. to point Ⓐ. Low side to chassis.	A14	Adjust so that 10.7MC occurs at center of crossover lines similar to Fig. 2 SLIGHTLY retouch A 11 for maximum amplitude and straightness of cross-over lines.
9.	"	High side to FM RF stator lug of tuning gang. Low side to chassis.	"	"	"	Vert. Amp. thru 27K to point Ⓒ. Low side to chassis	A15, A16 A17, A18 A19, A20	Adjust for curve of maximum amplitude and symmetry similar to Fig. 1

FM RF ALIGNMENT

Steps 11 and 12 are not necessary unless the receiver fails to track properly.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	BAND SWITCH POS.	RADIO DIAL SETTING	CONNECT VTVM	ADJUST	REMARKS
10.	270Ω Carbon Resistor	High side thru 270Ω to FM Ant. terminal. Low side to chassis.	108MC	FM	108MC	DC probe to point Ⓒ. Common to chassis.	A21	Adjust for maximum deflection.
11.	"	"	106MC	"	106MC	"		Adjust for maximum deflection by bending FM RF rotor plates of tuning gang.
12.	"	"	88MC	"	88MC	"	L4	Adjust by compressing or expanding coil turns for maximum deflection while rocking tuning gang

FIG. 1

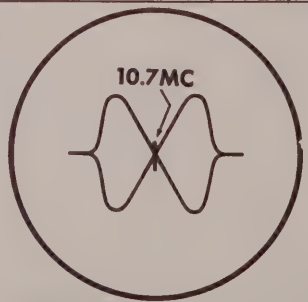


FIG. 2

PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE
V1	FM-RF Amplifier	6CB6
V2	FM Mixer	6AB4
V3	FM Osc. -FM AFC	12AT7
V4	AM RF Amplifier	6CB6
V5	AM Converter	6BE6
V6	1st. FM-AM IF Amplifier	6CB6

ITEM No.	USE	TYPE
V7	2nd FM IF Amp. -AM Det. -AVC	6CB6
V8	1st FM Limiter	6AU6
V9	2nd FM Limiter	6AU6
V10	Disc Riminator	6AL5
V11	Cath. Follower-Meter Amp.	12AU7
V12	Rectifier	6X4

ELECTROLYTIC CAPACITORS

ITEM No.	RATING CAP.	RATING VOLT.	REPLACEMENT DATA KNIGHT PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1A	▲40	300			D0032	FP420. 35	TMQ-3	D-130	R2366*
B	■40	300			BR4035	TC78	TD-20-250	MTD-3520	
C	▲30	250							
D	20	200							

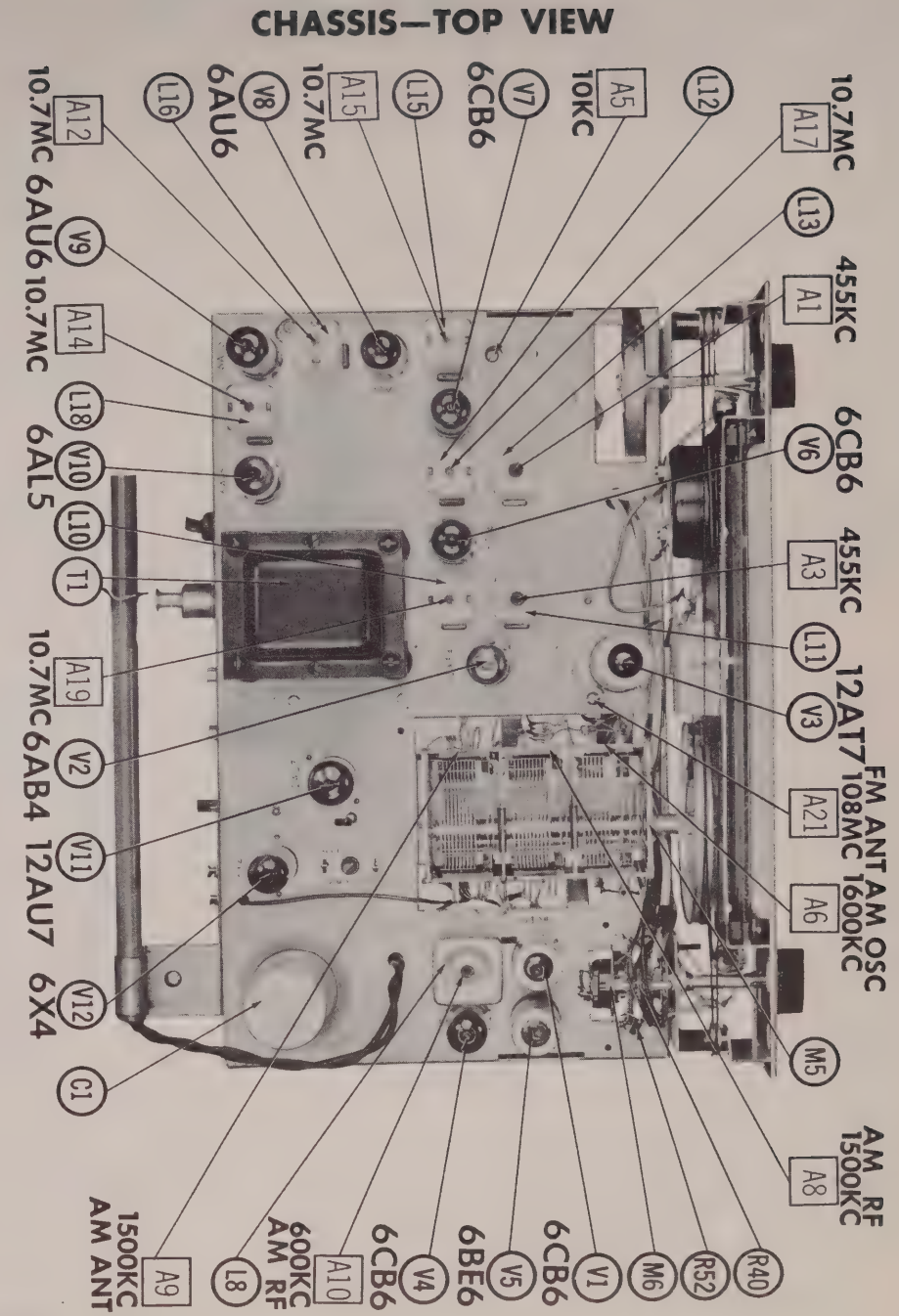
* Non Catalog Item

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING CAP.	RATING VOLT	REPLACEMENT DATA KNIGHT PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C2	5			NP0-DI5	DTZ-4R7	C10V5C	ZT-555	5TCCB-V5	NP0 10%
C3	10			NP0-DI10	DTZ-10	C10Q1C	ZT-541	5TCC-Q1	NP0 10%
C4	1000			BPD-001	DD-102	BYA6D1	DC521	5HK-D1	
C5	1000			BPD-001	DD-102	BYA6D1	DC521	5HK-D1	
C6	22			NP0-DI22	DTZ-22	C10Q22C		5TCC-Q22	NP0 10%
C7	.5-3				829-3		CT565A		
C8	10000			BPD-01	DD-103	BYA6S1	DC511	5HK-S1	
C9	10000			BPD-01	DD-103	BYA6S1	DC511	5HK-S1	
C10	2			NP0-DI2. 2	DTZ-2R2	C10V22C		5TCCB-V22	NP0 10%
C11	1000			BPD-001	DD-102	BYA6D1	DC521	5HK-D1	
C12	.047	200		P288N-047	DF-503	CUB2S47	GEM-4147	2TM-S47	
C13	22			NP0-DI22	DTZ-22	C10Q22C		5TCC-Q22	NP0 10%
C14	220			BPD-00022	DD-221	L10T22	UC-5322	5GA-T22	
C15	10			NP0-DI10	DTZ-10	C10Q1C	ZT-541	5TCC-Q1	NP0 10%
C16	1								10%
C17	5			NP0-DI5	DTZ-4R7	C10V5C	ZT-555	5TCCB-V5	NP0 10%
C18	1000			BPD-001	DD-102	BYA6D1	DC521	5HK-D1	
C19	10000			BPD-01	DD-103	BYA6S1	DC511	5HK-S1	
C20	1000			BPD-001	DD-102	BYA6D1	DC521	5HK-D1	
C21	220			BPD-00022	DD-221	L10T22	UC-5322	5GA-T22	
C22	220			BPD-00022	DD-221	L10T22	UC-5322	5GA-T22	
C23	1000			BPD-001	DD-102	BYA6D1	DC521	5HK-D1	
C24	10000			BPD-01	DD-103	BYA6S1	DC511	5HK-S1	
C25	.022	200		P288N-022	DD-203	CUB2S22	GEM-4122	4TM-S22	
C26	10000			BPD-01	DD-103	BYA6S1	DC511	5HK-S1	
C27	10000			BPD-01	DD-103	BYA6S1	DC511	5HK-S1	
C28	.22	200		P288N-22		CUB2S22	GEM-2022	2TM-P22	
C29	10000			BPD-01	DD-103	BYA6S1	DC511	5HK-S1	
C30	1000			EF-001	MFT-1000			503C-D1	
C31	10000			BPD-01	DD-103	BYA6S1	DC511	5HK-S1	
C32	5			NP0-DI5	DTZ-4R7	C10V5C	ZT-555	5TCCB-V5	NP0 10%
C33	47			NP0-DI47	DTZ-47	C10Q47C	ZT-5447	5TCC-Q47	NP0 10%
C34	22			NP0-DI22	DTZ-22	C10Q22C		5TCC-Q22	NP0 10%
C35	.022	200		P288N-022	DD-203	CUB2S22	GEM-4122	4TM-S22	
C36	10000			BPD-01	DD-103	BYA6S1	DC511	5HK-S1	
C37	10000			BPD-01	DD-103	BYA6S1	DC511	5HK-S1	
C38	10			NP0-DI10	DTZ-10	C10Q1C	ZT-541	5TCC-Q1	NP0 10%
C39	10000			BPD-01	DD-103	BYA6S1	DC511	5HK-S1	
C40	10000			BPD-01	DD-103	BYA6S1	DC511	5HK-S1	
C41	10000			BPD-01	DD-103	BYA6S1	DC511	5HK-S1	
C42	1000			EF-001	MFT-1000			503C-D1	
C43	47			NP0-DI47	DTZ-47	C10Q47C	ZT-5447	5TCU-Q47	NP0 10%
C44	47			NP0-DI47	DTZ-47	C10Q47C	ZT-5447	5TCU-Q47	NP0 10%
C45	9-180								
C46	10000			BPD-01	DD-103	BYA6S1	DC511	5HK-S1	
C47	10000			BPD-01	DD-103	BYA6S1	DC511	5HK-S1	
C48	10000			BPD-01	DD-103	BYA6S1	DC511	5HK-S1	

CHASSIS—TOP VIEW



KNIGHT
MODEL KN-110 (92SX403)

PARTS LIST AND DESCRIPTIONS (Continued)

CAPACITORS (cont)

ITEM No.	RATING CAP.	RATING VOLT	KNIGHT PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C49	22			NP0-DI22	DTZ-22	C10Q22C		5TCC-Q22	NP0 10%
C50	1000			EF-001	MFT-1000			503C-D1	
C51	1500			BPD-0015	DD-152	BYA10D15	DC5215	5HK-D15	
C52	10000			BPD-01	DD-103	BYA6S1	DC511	5HK-S1	
C53	1000			EF-001	MFT-1000			503C-D1	
C54	1000			EF-001	MFT-1000			503C-D1	
C55	22			NP0-DI22	DTZ-22	C10Q22C		5TCC-Q22	NP0 10%
C56	1000			EF-001	MFT-1000			503C-D1	
C57	1500			BPD-0015	DD-152	BYA10D15	DC5215	5HK-D15	
C58	1500			BPD-0015	DD-152	BYA10D15	DC5215	5HK-D15	
C59	10000			BPD-01	DD-103	BYA6S1	DC511	5HK-S1	
C60	100			NP0-DI100	DTZ-100	C10T1C	ZT-531	5TCC-T1	NP0 10%
C61	470								
C62	1000			EF-001	MFT-1000			503C-D1	
C63	10000			BPD-01	DD-103	BYA6S1	DC511	5HK-S1	
C64	.1	200		P288N-1	DF-104	CUB2P1	GEM-201	2TM-P1	
C65	.1	200		P288N-1	DF-104	CUB2P1	GEM-201	2TM-P1	
C66	.1	200		P288N-1	DF-104	CUB2P1	GEM-201	2TM-P1	
C67	10000			BPD-01	DD-103	BYA6S1	DC511	5HK-S1	
C68	68			N750-DI68	DTN-68	C10Q68U		5TCU-Q68	N750 10% ①
C69	100			NP0-DI100	DTZ-100	C10T1C	ZT-531	5TCC-T1	NP0 10%

①Not used in some versions.

CONTROLS

ITEM No.	RATING RESIST-ANCE	RATING WATTS	KNIGHT PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	25K	½	RP-253B	AB-29 *		B13-120	U28A *	Volume
B	Shaft			AK-1		TM2-Kit	Not Req.	
R2A	1000Ω	½	RP-102C	AB-5*	A47-1000-S*	B11-108	TA13L	Meter Adjust
B	Shaft			AK-1	FKS-1/4	TM2-Kit	Not Req.	

* Enlarge mounting hole to 3/8"

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING OHMS	RATING WATT	KNIGHT PART No.	NOTES
R3	180Ω			
R4	2200Ω			
R5	33K			
R6	10Ω			
R7	4700Ω			
R8	220Ω			
R9	330Ω			
R10	47K	1		
R11	10K	1		
R12	1000Ω			
R13	2200Ω			
R14	100K			
R15	100K			
R16	3900Ω	2		
R17	100K			
R18	22K			
R19	10K	1		
R20	470K			
R21	1meg			
R22	68K			
R23	180Ω			
R24	4700Ω			
R25	47K			
R26	4700Ω			
R27	180Ω			
R28	100K			
R29	1meg			
R30	15K			
R31	47K	2		
R32	100K			
R33	3.3meg			
R34	22K	2		
R35	22K	2		
R36	15K			
R37	100K 5%			
R38	100K 5%			
R39	150K			
R40	3.3meg			
R41	220K			
R42	2.2meg			
R43	1meg			
R44	22K	2		
R45	470Ω			
R46	470K			
R47	470Ω			
R48	500Ω	10		
R49	1000Ω	2		
R50	47Ω			
R51	47Ω			
R52	22Ω			
R53	470K			

PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (POWER)

ITEM No.	RATING PRI.	RATING SEC. 1	RATING SEC. 2	KNIGHT PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
T1	117V @.5A	390VCT @.059A	6.3V @4.3A	LP-0244B						

COILS (RF-IF)

ITEM No.	USE	KNIGHT PART No.	Meissner PART No.	Merit PART No.	Miller PART No.	Ram PART No.	NOTES
L1	FM Ant. Coil	LW-0106					
L2	Fil. Choke		19-1007	BC-560	4590		.68 Microhenry †
L3	RF Choke						1.3 Microhenries †
L4	FM Osc.	L1-0050					
L5	Fil. Choke		19-1007	BC-560	4590		.68 Microhenry †
L6	FM Mixer Coil	LW-0105					
L7	Loop Stick	LW-0109					
L8	AM RF Trans.	LW-0074					
L9	AM Osc. Coil	LL-0049			70-Osc*		
L10	1st FM IF	LR-0032	16-3487	FM-254	1463		
L11	1st AM IF	LR-0041	16-6770	BC-352	12-C1	RF-1	
L12	2nd FM IF	LR-0043	16-3487	FM-254	1463		
L13	2nd AM IF	LR-0041	16-6770	BC-353	12-C2	RF-2	
L14	Fil. Choke		19-1007	BC-560	4590		.68 Microhenry †
L15	3rd FM IF	LR-0043	16-3487	FM-254	1463		
L16	FM Limiter	LR-0043	16-3487	FM-254	1463		
L17	Fil. Choke		19-1007	BC-560	4590		.68 Microhenry †
L18	Discriminator	LQ-0179	17-3494	FM-253	1464		

* Disregard Primary

† IRC Part #CLA

FILTER CHOKE

ITEM No.	RATINGS CURRENT (Measured)	RATINGS DC RES.	RATINGS INDUCTANCE (0 CURRENT 1000 ~)	KNIGHT PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.
L19		1800Ω	2.7HY							

MISCELLANEOUS

ITEM No.	PART NAME	KNIGHT PART No.	NOTES
M1	Dial Lamp		#44
M2	Dial Lamp		#44
M3	Lamp		#47 AM Indicator
M4	Lamp		#47 FM Indicator
M5	Tuning, Cap.	CV-102	5 Gang, FM-AM
M6	Switch		Function, 2 Section, Rotary Wafer Type, with Power On-Off, SPST, FM-AM Tuning
M7	Meter		

WIRING DATA

General-use Unshielded Hook-up Wire ..... Use BELDEN No. 8530 (Solid) Available in Ten Colors
8524 (Stranded) Available in Ten Colors

Power Cord ..... Use BELDEN No. 1765-B (6 Ft. Length)
1725-K (7½ Ft. Length)

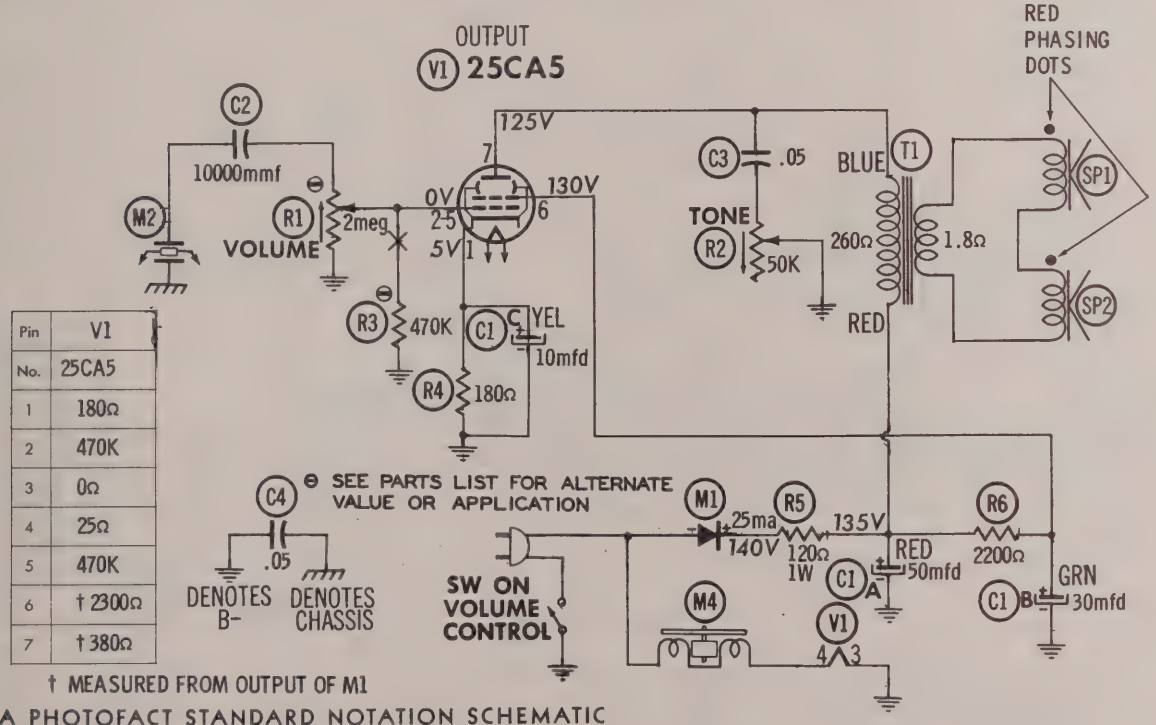
PHOTOFACT* Folder

MOTOROLA MODELS 2F21B, R (Ch. HS-598)

MOTOROLA MODELS 2F21B, R (Ch. HS-598)

MODEL 2F21B

TRADE NAME	Motorola Models 2F21B, 2F21R (Ch. HS-598)
MANUFACTURER	Motorola Inc., 4545 W. Augusta Blvd., Chicago 51, Illinois.
TYPE SET	AC Operated Phono Amplifier with 4 Speed Manual Record Player
TUBES (One)	Type 25CA5 Output
POWER SUPPLY	110-120 Volts AC-60 Cycles RATING .42 Amp. @117 Volts AC (43 Watts)



Pin No.	V1 25CA5
1	180Ω
2	470K
3	0Ω
4	25Ω
5	470K
6	† 2300Ω
7	† 380Ω

† MEASURED FROM OUTPUT OF M1

A PHOTOFACT STANDARD NOTATION SCHEMATIC

Howard W. Sams & Co., Inc. 1958

HOWARD W. SAMS & CO., INC. • Indianapolis 5, Indiana

The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed. Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. © 1958 Howard W. Sams & Co., Inc., Indianapolis 5, Indiana. Printed in U.S. of America

H429

SET 409 FOLDER 12

PARTS LIST AND DESCRIPTIONS
TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V1	Output	25CA5	

ITEM No.	USE	TYPE	NOTES

ELECTROLYTIC CAPACITORS

ITEM No.	RATING CAP.	RATING VOLT.	REPLACEMENT DATA MOTOROLA PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1A	50	150	23K634545	PRS150/25V50 30/20	BBRT5315C	TCT-3107	TDLT-15	FMT-327	TVA-3430
B	30	150							
C	10	10							

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING CAP.	RATING VOLT	REPLACEMENT DATA MOTOROLA PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C2	10000		21R121946	BPD-01	DD-103	BYA6S1	DC511	5HK-S1	
C3	.05	400	8K125147	P488N-05	DF-503	CUB4S5	GEM-415	4TM-S5	
C4	.05	200	8R121005	P288N-05	DF-503	CUB2S5	GEM-415	2TM-S5	

CONTROLS

ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA MOTOROLA PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	2meg	½	18K639749	B-76	A47-2meg-Z	Q13-139	U55	Volume (Note 1)
B	Shaft			Not Req.	FS-3	Not Req.	Not Req.	
C	Switch			* KB-1 orKR-1	SWE-12	76-1	US-26	
R2A	50K	½	18K638987	B-31	A47-50K-S	Q11-123	U35	Tone
B	Shaft			Not Req.	FS-3	Not Req.	Not Req.	

Note 1. Some Chassis may use 500K control Part #18K639105. When replacing use 2meg control.
* Use KR with CRL "red label" controls and KB with "blue label" controls.

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING OHMS	RATING WATT	MOTOROLA PART No.	NOTES
R3	470K		6K121279	Note 1
R4	180Ω		6R5660	

ITEM No.	RATING OHMS	RATING WATT	MOTOROLA PART No.	NOTES
R5	120Ω	1	6R488021	
R6	2200Ω		6R6290	

Note. 1. Not used in some versions.

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE PRI.	IMPEDANCE SEC.	REPLACEMENT DATA MOTOROLA PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	NOTES
T1	3600Ω	6-8Ω	25B639195	Z1001 ①	A-2900①	AU-608①	A-2203①	24S60 ①	S-51X①	① Drill new mounting hole.

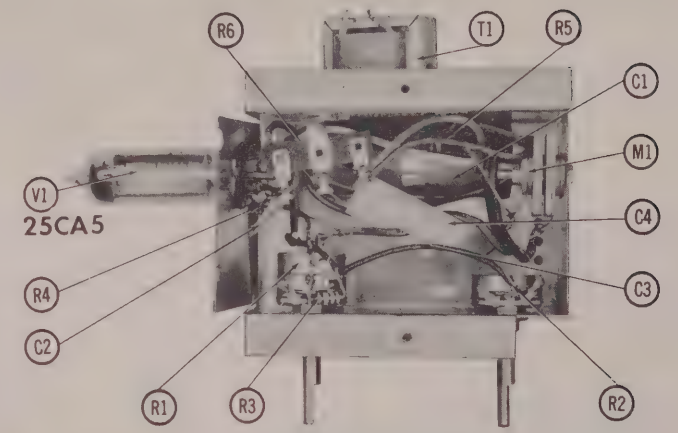
SPEAKER

ITEM No.	TYPE SIZE	TYPE FIELD	TYPE V. C. IMP.	REPLACEMENT DATA MOTOROLA PART No.	REPLACEMENT DATA QUAM PART No.	NOTES
SP1	4"	PM	3-4Ω	50C638897①	4A1 ①	①Phase
SP2	4"	PM	3-4Ω	50K639435①	4A1 ①	

SELENIUM RECTIFIER

ITEM No.	RATING CURRENT (Measured)	REPLACEMENT DATA MOTOROLA PART No.	FEDERAL PART No.	INTERNATIONAL PART No.	SARKES TARZIAN PART No.	NOTES
M1	.025A	48K791092	1002A	RS065	65 M150①	① Silicon Type

CHASSIS—BOTTOM VIEW



PHONO CARTRIDGE

ITEM No.	REPLACEMENT DATA MOTOROLA PART No.	ASTATIC PART No. CARTRIDGE	ASTATIC PART No. NEEDLE	ELECTRO-VOICE PART No. CARTRIDGE	ELECTRO-VOICE PART No. MOUNT	REMARKS
M2	59B638903 ①	310TS	N8-1 N8-3			①Includes needle

ASTATIC NEEDLE LISTING SHOWN ABOVE IS SPECIFIED FOR THE RESPECTIVE REPLACEMENT CARTRIDGE LISTED. FOR ORIGINAL CARTRIDGE NEEDLE REPLACEMENTS SEE BELOW.

PHONO NEEDLE

(FOR REPLACEMENT IN ORIGINAL EQUIPMENT CARTRIDGE)

ITEM No.	REPLACEMENT DATA MOTOROLA PART No.	JENSEN PART No.	WALCO PART No.	REMARKS
M3	47K638905 (78 rpm)	† CRA-55 or ♦ CRA-55D	† W64S or ♦ W64D	♦ Diamond † Jewel
	47K638904 (LP)	† CRA-55LP or ♦ CRA-55LPD	† W64MGS or ♦ W64MGD	

MISCELLANEOUS

ITEM No.	PART NAME	MOTOROLA PART No.	NOTES
M4	Motor	71K635021	Phono, includes turntable ass'y & speed indicator plate

CABINETS & CABINET PARTS

(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

NAME	PART NO.	DESCRIPTION
Knob	36K639208	Red, On-Off & Volume
Knob	36K639207	White, Tone
Cabinet	1W639247	Blue, Model 2F21B
Cabinet	1V639248	Red, Model 2F21R

WIRING DATA

General-use Unshielded Hook-up Wire	Use BELDEN No. 8530 (Solid) Available in Ten Colors 8524 (Stranded) Available in Ten Colors
Power Cord	Use BELDEN No. 1765-B (6 Ft. Length) 1725-K (7½ Ft. Length)
Low-Loss Shielded Lead (interconnecting)	Use BELDEN No. 8401
Phono Pick-up Arm Cable	Use BELDEN No. 8430 (Two Conductor - Twisted)

PHOTOFACT* Folder

EIA MEMBER ELECTRONIC INDUSTRIES ASSOCIATION

MOTOROLA MODELS
5R23G, -1, 5R23N, -1 (Ch. HS-600, HS-643)

MOTOROLA MODELS
5R23G, -1, 5R23N, -1 (Ch. HS-600,HS-643)

MODEL 5R23G

MOTOROLA MODELS
5R23G, -1, 5R23N, -1 (Ch. HS-600,HS-643)

TRADE NAME	Motorola Models 5R23G, 5R23N (Ch. HS-600); 5R23G-1, 5R23N-1 (Ch. HS-643)
MANUFACTURER	Motorola Inc., 4545 W. Augusta Blvd., Chicago 51, Illinois
TYPE SET	AC Operated AM Receiver with 4 Speed Automatic Record Changer
TUBES (Five)	Types 12BE6 Converter, 12BA6 IF Amplifier, 12AV6 Det.-AVC-AF Amp., 50C5 Output, 35W4 Rectifier
POWER SUPPLY	110-120 Volts AC-60 Cycle — RATING .29 Amp. @117 Volts AC (27Watts Less Motor)
TUNING RANGE—BROADCAST	535-1620KC

FOR SERVICE INFORMATION ON RECORD CHANGER BR3RC USED IN MODELS 5R23G AND 5R23N—SEE SIMILAR MONARCH UA8—PHOTOFACT SET 381 FOLDER 11.

FOR SERVICE INFORMATION ON RECORD CHANGER VM15RC USED IN MODELS 5R23G-1 AND 5R23N-1—SEE SIMILAR V-M 1200A— PHOTOFACT SET 353 FOLDER 16 OR RECORD CHANGER MANUAL RC-10.

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

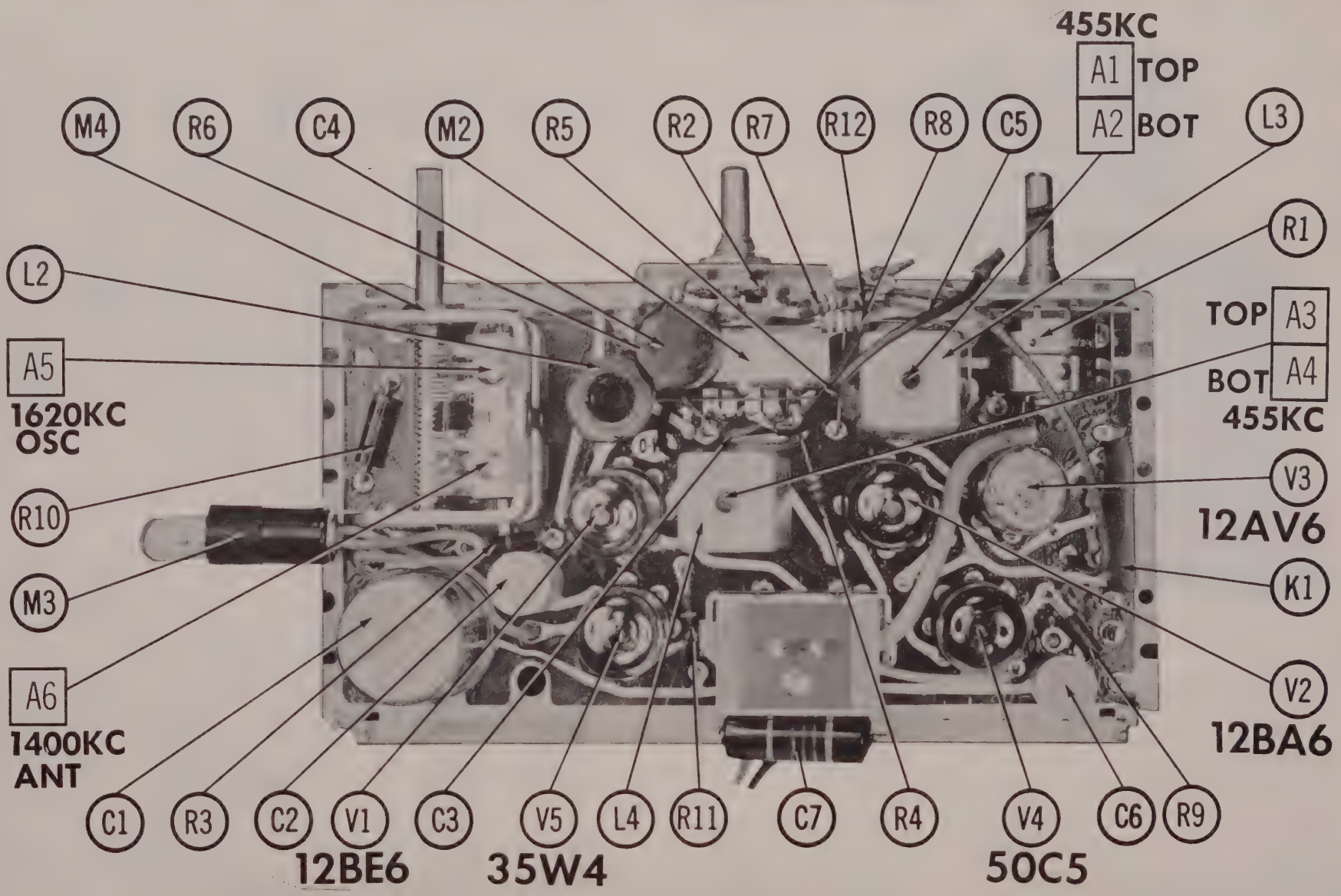
Use isolation transformer, if available. If not, connect a .1mfd capacitor in series with low side of signal generator and B—. Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.1mfd	High side to pin 7 (grid) of 12BE6 (V1) Low side to chassis.	455KC (400∿ Mod.)	Tuning gang fully open.	Across Voice Coil	A1, A2. A3, A4	Adjust for maximum output.
2.	"	"	1620KC	"	"	A5	"
3.		Loop	1400KC	Tune to 1400KC signal.	"	A6	Fashion loop of several turns of wire and radiate signal into loop of receiver Adjust for maximum output.

HOWARD W. SAMS & CO., INC. • Indianapolis 5, Indiana

The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of H579

the particular type of replacement part listed. Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. © 1958 Howard W. Sams & Co., Inc., Indianapolis 5, Indiana. Printed in U.S. of America



CHASSIS TOP VIEW

PARTS LIST AND DESCRIPTIONS
TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V1	Converter	12BE6	
V2	IF Amplifier	12BA6	
V3	Det. -AVC-AF Amp.	12AV6	
V4	Output	50C5	
V5	Rectifier	35W4	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING CAP.	RATING VOLT.	Motorola PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1A	■50	150	23B632015	AFH2-15-05	BBRD5315	PFP213.1	TDLD-8	MTD-301	R2230*
B	▲30	150							

* Non Catalog Item

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING CAP.	RATING VOLT	Motorola PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C2	.05	400	8K121268	P488N-05		BC8S47J	ACE615	4SE-S47	
C3	10000		21B533471	BPD-01	DD-103	BYA6S1	DC511	5HK-S1	
C4	4700		21R120149	BPD-0047	DD-472	BYA10D47	UC-5247	5HK-D47	
C5	2000		21R121106	BPD-002	DD-202	BYA10D2	DC522	5HK-D2	
C6	.01	400	8K122334	P488N-01		BC4S1J	ACE411	4SE-S1	
C7	.047	400	8K125147	P488N-047	DF-503	CUB4S47	GEM-4147	4TM-S47	

CONTROLS

ITEM No.	RATING RESISTANCE	RATING WATTS	Motorola PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	INSTALLATION NOTES
R1A	1meg	½	18K638706					Volume, Tap ⓐ 300K
B	Switch							Power On-Off
R2A	1meg	½	18B638708					Tone Note 1.
B	Switch							Phono-Radio

Note 1. Use Part #18B634577 when replacing.

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING OHMS	RATING WATT	Motorola PART No.	NOTES
R3	22K		6K119405	
R4	27K		6K121300	
R5	100Ω		6K119402	
R6	3.3meg		6K119407	
R7	39K		6K125535	
R8	39K		6K125535	
R9	150Ω		6K119403	
R10	1000Ω	1	6K119404	
R11	27Ω		6B119401	
R12	39K		6K125535	

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE PRI.	IMPEDANCE SEC.	Motorola PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	NOTES
T1	2300Ω	2-3Ω	25C639524	Z1001			A-3876	22S46		

SPEAKER

ITEM No.	TYPE SIZE	TYPE FIELD	TYPE V. C. IMP.	Motorola PART No.	QUAM PART No.	NOTES
SP1	6"	PM	3-4Ω	50K639525①	6A1	①Alternate Part # 50K639526
SP2	4"	PM	6-8Ω	50K636688	4A07Z8	

PARTS LIST AND DESCRIPTIONS (Continued)
COILS (RF-IF)

ITEM No.	USE	Motorola PART No.	Meissner PART No.	Merit PART No.	Miller PART No.	Ram PART No.	NOTES
L1	Loop Stick	24K639566					
L2	Osc. Coil	24K636206					
L3	Input IF	24K636016	16-6780	BC-356	13-PC9	RF-4	
L4	Output IF	24K638563	16-6780	BC-357	13-PC10	RF-4	

COMPONENT COMBINATIONS

ITEM No.	USE	DESCRIPTION	Motorola PART No.	REPLACEMENT DATA
K1	Audio Coup. Net.	5000mmf, 5000mmf, 220mmf 250mmf 470K, 470K, 6.8meg	51B635833	Aerovox PA-512 Centralab PC-158 Sprague DT-5

PHONO CARTRIDGE

ITEM No.	Motorola PART No.	ASTATIC PART No. CARTRIDGE	ASTATIC PART No. NEEDLE	ELECTRO-VOICE PART No. CARTRIDGE	ELECTRO-VOICE PART No. MOUNT	REMARKS
M1		81-TB		56	*PT-1	* Not required unless original mounting mechanism is damaged.

PHONO NEEDLE

(FOR REPLACEMENT IN ORIGINAL EQUIPMENT CARTRIDGE)

ITEM No.	Motorola PART No.	JENSEN PART No.	WALCO PART No.	REMARKS
M2				

MISCELLANEOUS

ITEM No.	PART NAME	Motorola PART No.	NOTES
M3	Lamp		#1847 (Alternate Type #40, Part #65R125595)
M4	Tuning Cap.	19K638705	2 gang (Ant. 20-273mmf)
	Printed Board	84B638710	Less All Components (Add Letter Suffix, If Any).

CABINETS & CABINET PARTS

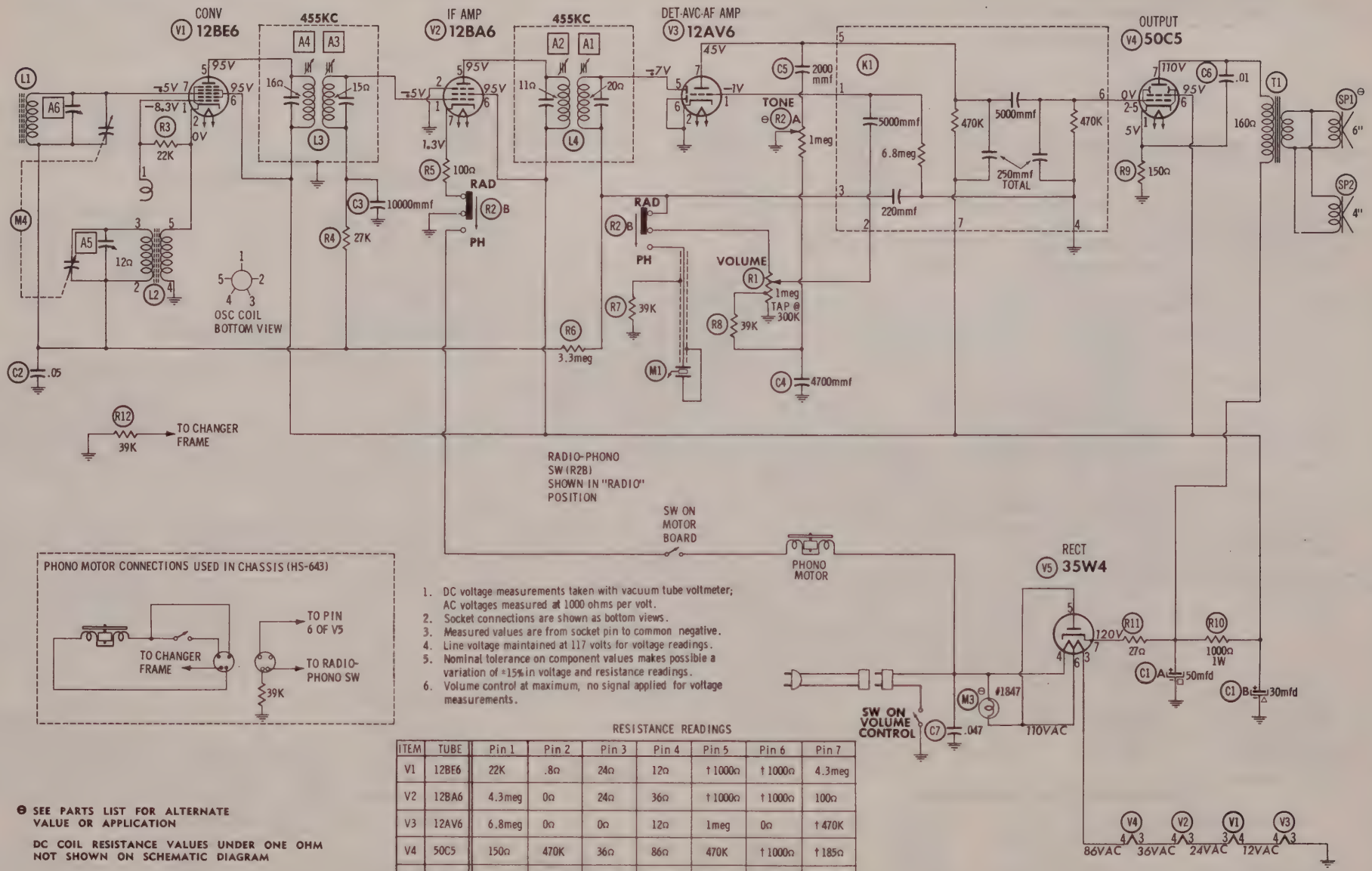
(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

NAME	PART NO.	DESCRIPTION
Knob	36K639726	Tone
Knob	36C638438	Tuning
Knob	36K639725	Volume
Cabinet	16K638967	Complete, White and Green, Less Grille and Nameplate, Models 5R23G, -1
Cabinet	16K638964	Complete, Tan, Less Grille and Nameplate, Models 5R23N, -1
Handle	55K638425	
Catch	55K638429	Cabinet Cover
Hinge	55K638404	Left Hand
Hinge	55K638406	Right Hand

WIRING DATA

General-use Unshielded Hook-up Wire ..... Use BELDEN No. 8530 (Solid) Available in Ten Colors
8524 (Stranded) Available in Ten Colors

Power Cord ..... Use BELDEN No. 1765-B (6 Ft. Length)
1725-K (7½ Ft. Length)



1. DC voltage measurements taken with vacuum tube voltmeter; AC voltages measured at 1000 ohms per volt.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Line voltage maintained at 117 volts for voltage readings.
5. Nominal tolerance on component values makes possible a variation of ±15% in voltage and resistance readings.
6. Volume control at maximum, no signal applied for voltage measurements.

RESISTANCE READINGS

ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7
V1	12BE6	22K	.8Ω	24Ω	12Ω	†1000Ω	†1000Ω	4.3meg
V2	12BA6	4.3meg	0Ω	24Ω	36Ω	†1000Ω	†1000Ω	100Ω
V3	12AV6	6.8meg	0Ω	0Ω	12Ω	1meg	0Ω	†470K
V4	50C5	150Ω	470K	36Ω	86Ω	470K	†1000Ω	†185Ω
V5	35W4	NC	NC	86Ω	110Ω	102Ω	102Ω	20K(MIN)

† MEASURED FROM PIN 7 OF V5
NC NO CONNECTION

Θ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM

A PHOTOFACT STANDARD NOTATION SCHEMATIC

© Howard W. Sams & Co., Inc. 1958

409-13

PHOTOFACT* Folder

EIA MEMBER ELECTRONIC INDUSTRIES ASSOCIATION

PERPETUUM-EBNER
MODEL Rex Deluxe

PERPETUUM-EBNER
MODEL Rex Deluxe

PERPETUUM-EBNER
MODEL Rex Deluxe

GENERAL INFORMATION

The Perpetuum-Ebner Rex Deluxe record changer plays a stack of records in automatic sequence and shuts off after the last record has been played.

The tripping method is the velocity type. The recoil lever contacts the ejection cam, which rotates with the turntable to start the mechanism into cycle.

The mercury-type motor switch shuts off the changer after the last record of the stack has been played.

This record changer must be connected to an AC supply only.

Manufactured by:

Perpetuum-Ebner
St. Georgen Schwarzwald
Western Germany

Supplied by:

Majestic International Sales Corporation
743 West La Salle Street
Chicago 10, Illinois

This material compiled and published by

HOWARD W. SAMS & CO., INC., INDIANAPOLIS, INDIANA

C353

Copyright 1958 • All Rights Reserved

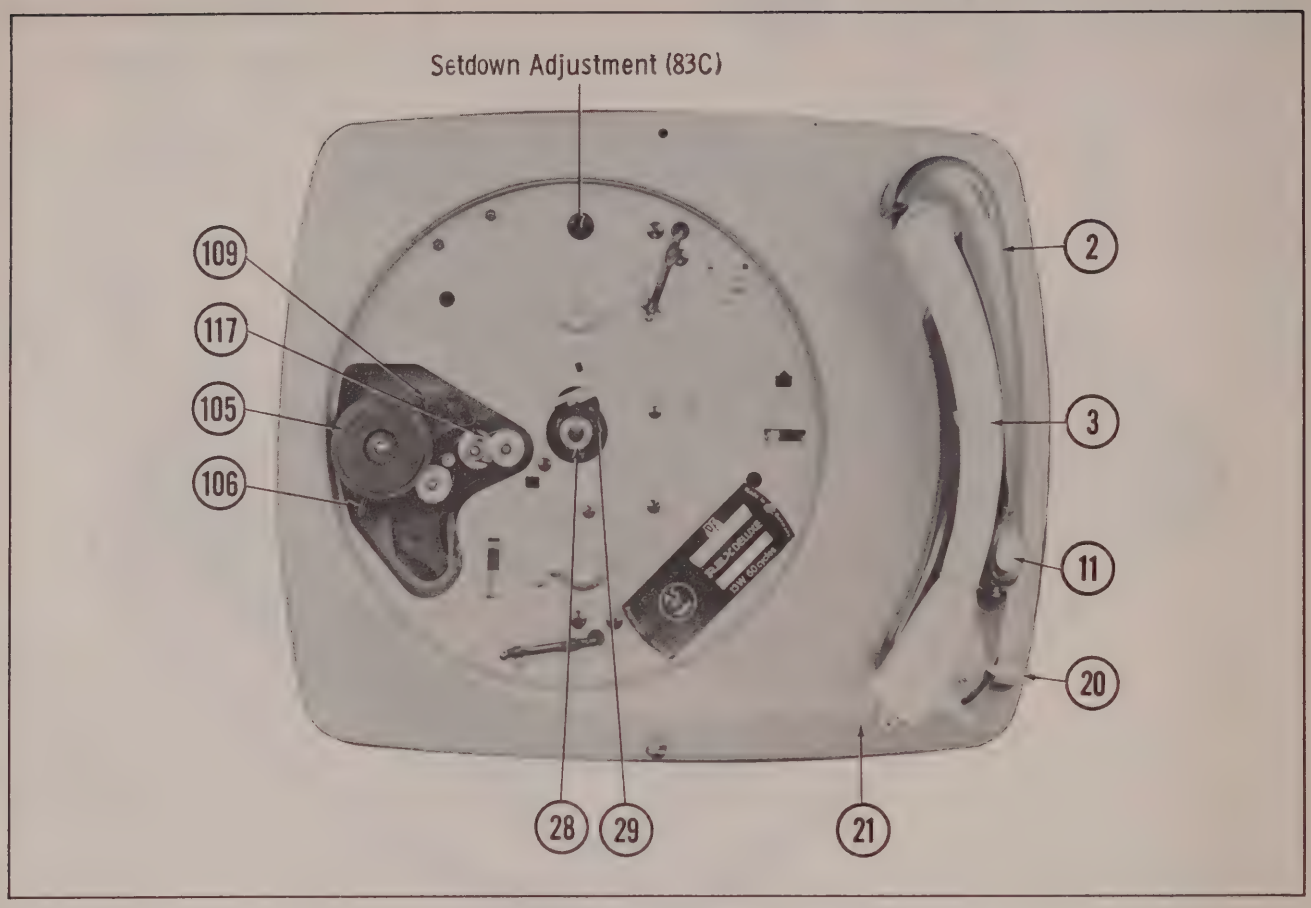


FIG 1. TOP VIEW OF CHANGER WITH TURNTABLE REMOVED

FUNCTIONS OF THE CONTROLS

Starting Key

Depressing this key starts the changer into automatic operation. Also, a record may be rejected at any time by pressing this key.

Speed Control Lever

Speed control lever (20) determines the turntable speed, 16 2/3, 33 1/3, 45 or 78 rpm.

OPERATING INSTRUCTIONS

Loading

Place records on spindle and lower to spindle shelf.

Starting

To start the changer (after checking that the stylus and speed control lever are in the proper position for the records to be played), depress starting key (11) and release. The changer operates automatically until the last record has been played. At this time, the tone arm is returned to its rest and the supply to the motor is switched off.

Rejecting

To reject a record at any time while the changer is operating, depress starting key (11) and release.

DESCRIPTION OF MAJOR FUNCTIONS

Starting Mechanism Functions

When starting key (11) is depressed, safety catch (16) is pushed back, freeing tone arm (3). Simultaneously, starting bar (37) moves into groove of starting rod (13), and switch latch (17) is brought forward to ready position. This puts tension on friction wheel spring (106) through action of switch bar (41) moving backward, pressing spring tensed friction wheel (105) against drive shaft of motor and inner edge of turntable.

Mercury-type motor switch is actuated by switch bar (41), setting turntable (26) into motion. When starting bar (37) hits back of switch latch (17), the change-over process is begun. Switch bar (41) pushes back recoil lever (80), pushing leaf spring against ratchet (83A). This releases the stop for the toothed segment allowing it to fall into the gap between the teeth. By this action, tooth gear (83) is engaged with the turntable driver pinion (28).

Function of Motor and Wheel Driver

The motor and the shafts for the four speeds are so fastened to mounting plate (110) that the motor can swing freely. To drive turntable, friction wheel (105) engages the step of the proper shaft. Individual shafts

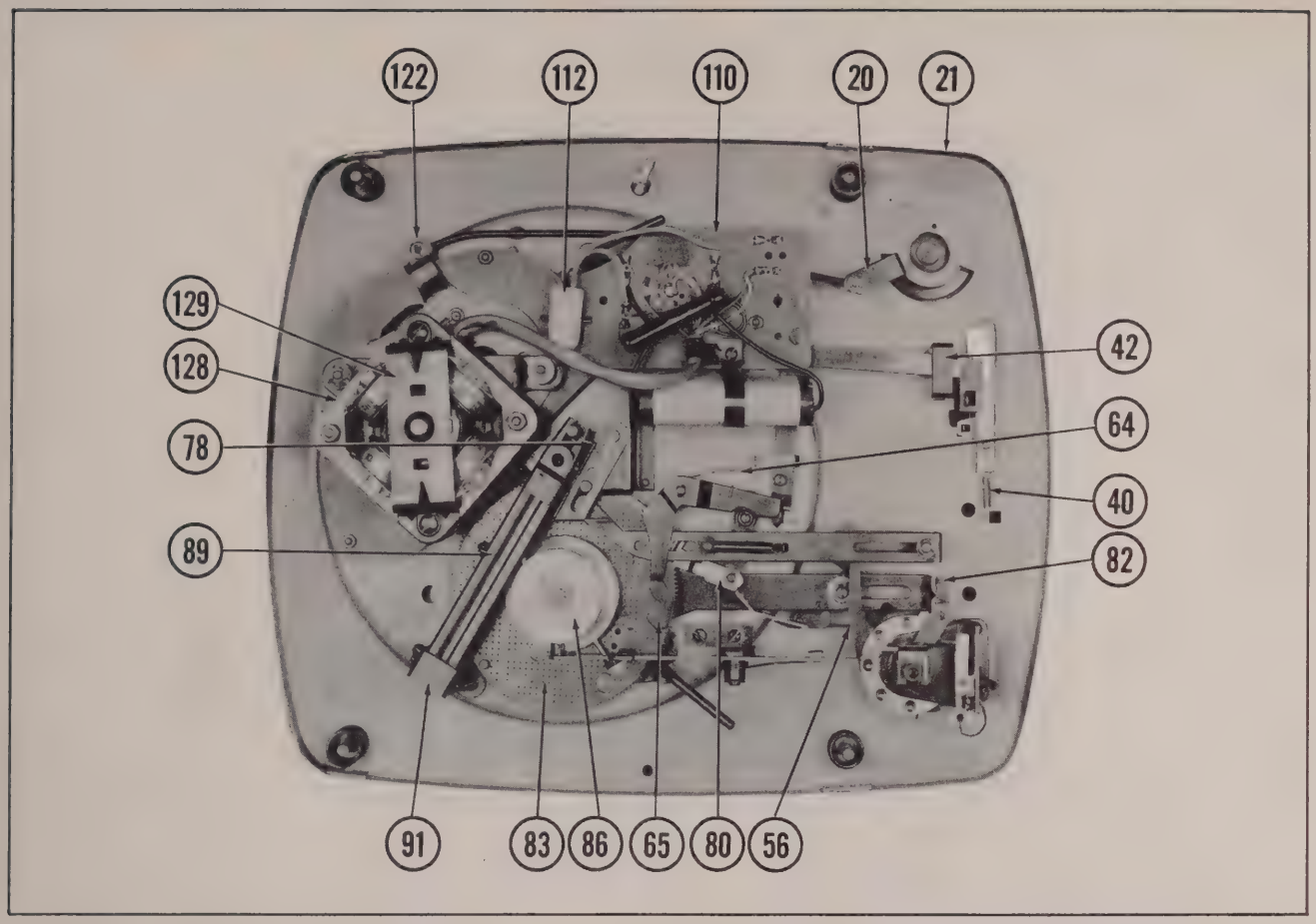


FIG 2. BOTTOM VIEW OF CHANGER

are driven from the motor shaft by means of drive belts (117).

To change speeds, starting lever (122) is actuated by speed changing lever (20) through a connecting bar (34). To reduce friction in the horizontal movement of friction wheel (105), it is mounted on a ball bearing. When changer is at rest, friction wheel (105) does not contact motor shaft.

Tone Arm Vertical Functions

The rising and falling of tone arm is controlled by rocking lever (51). The original setting of the bolt on rocking lever (51) must be at the deepest point of cam mount (86). As soon as tooth gear (83) is no longer in neutral, rocking lever (51) lifts tone arm by means of lifting spindle (52). At the same time, coupling flange (43) is pressed onto deflection lever (56) by way of the coupling plate, and tone arm friction comes into effect. The friction coupling for the tone arm is brought about by tone arm striking the record, also obtaining the record diameter. The friction coupling is under friction until the tone arm touches the first record on turntable.

When rocking lever (51) is again in its deepest point of cam mount (86) at the end of the cycle, coupling disk (43) disengages from deflection lever (56) by its weight. The muting switch for the tone arm is actuated by the free end of rocking lever. In the out-of-cycle position, the muting switch contacts are open. Turning tooth gear (83) approximately four teeth closes the contacts. The tone arm height is adjustable by the lifting spindle (52), which is secured by a nut.

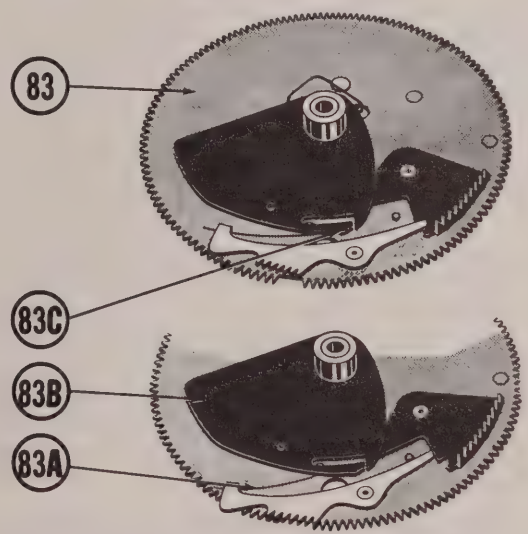


FIG 3. TOP VIEW OF TOOTH GEAR

Tone Arm Horizontal Functions

Movement of the tone arm is brought about by conveyor lever (82) and cam on tooth gear (83). Conveyor lever (82), under friction and coupled with arresting stirrup (43), presses tone arm with its feeler against edge of record as it swings in toward spindle.

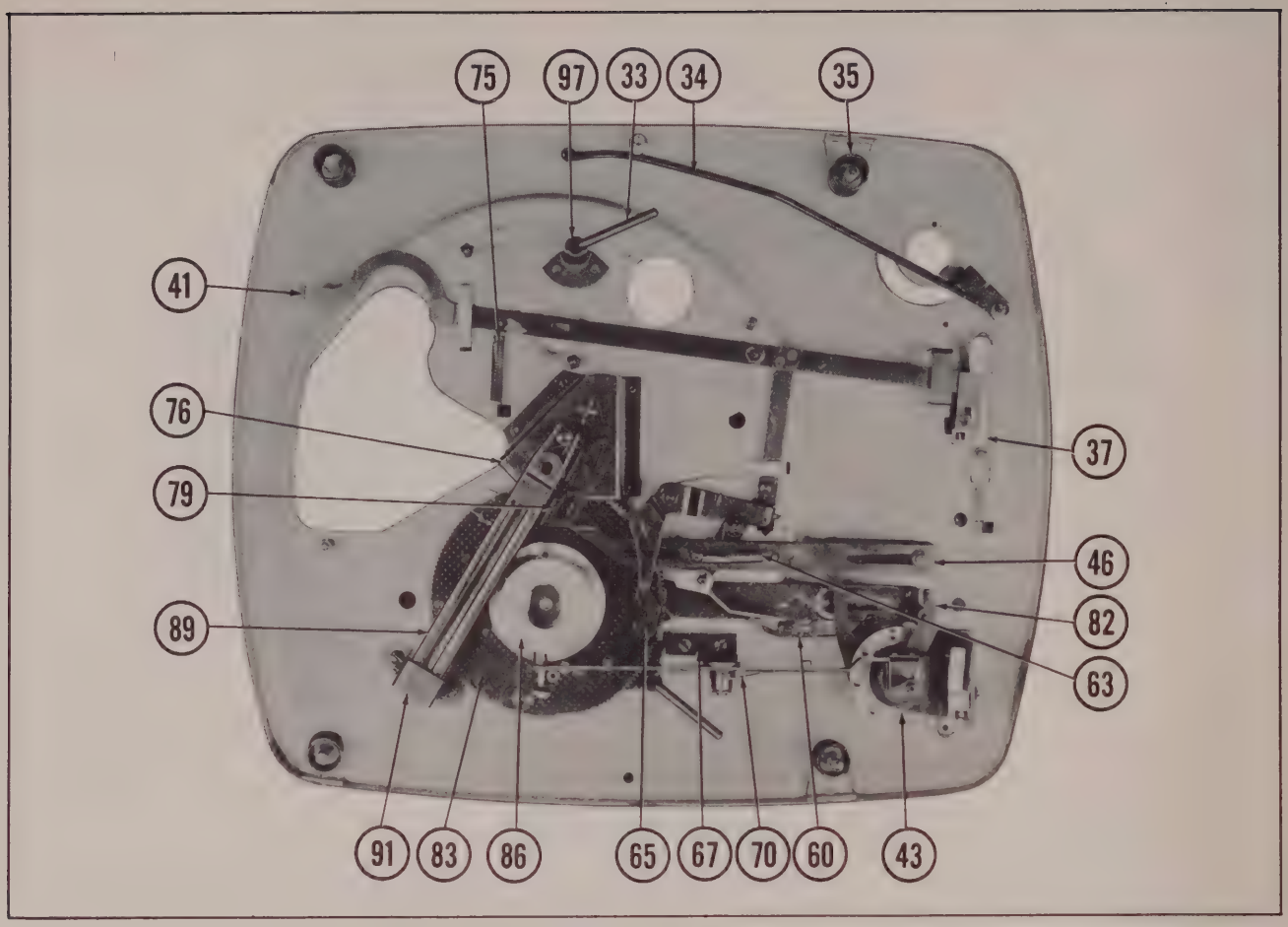


FIG. 4 BOTTOM VIEW OF CHANGER WITH MOTOR REMOVED

The friction coupling is adjusted to the size of the record. After gauging the diameter of the record, the tone arm swings about 1/64" away, permitting the record to fall freely. Meanwhile, return spring (83A), riveted to tooth gear (83), momentarily pushes back conveyor lever (82).

After record has fallen, tone arm swings toward the inside by means of conveyor lever (82), moving cam (83B) so the needle is poised directly over the starting groove. In this position, the tone arm is lowered onto the record. Cam (83B) has an adjustment plate with which the point of the engagement can be changed (see Fig. 3).

CHANGE CYCLE

The change cycle operation should be observed by manually rotating the turntable. The following action can then be followed and the function of each part more easily understood.

This changer is provided with a velocity trip mechanism. The change cycle is started by the faster motion of the tone arm when the needle enters the trip grooves at the end of the record. Only records with fast-finishing grooves will operate this trip.

While the record is playing, the tone arm moves slowly to the center of the turntable. By this movement, deflection lever (56) is also swung inward, taking along with it recoil lever (80), which is under friction..

When the tone arm has played the record over a radius of 2 3/8", the point of the recoil lever comes into the reach of deflection cam (29). As long as the progress of the tone arm in the playing groove continues, recoil lever (80) is kept pushed back by deflection cam (29). As soon as the tone arm runs into the finishing groove, the advance of the tone arm and with it the recoil lever, is greater with every revolution. Recoil lever (80) is pushed back by deflection cam (29).

Through this movement, the leaf spring on recoil lever (80) pushes back the spring catch so that toothed segments fall into gap of tooth gear (83) and contact turntable driver pinion (28). As tooth gear (83) rotates, changer cycle begins.

Spring on recoil lever (80) latches again, pushing bearing lever and recoil lever toward the front; spring (59) of rebound lever latch (60) brings bearing lever, and with it the recoil lever, back to its original position. The tooth segment is pushed back from turntable driver pinion (28) by the rotation of tooth gear (83) through the protruding end of lever connected with the segment. By this action, the gap in tooth gear (83) is left open and tooth segment is held by the ratchet.

The records drop when ejector bar in spindle shaft is moved down. The ejection bar is coupled with release lever (89), which operates from cam mount (86) and gives an up and down motion to release lever (89), causing ejector to move up and down in the spindle.

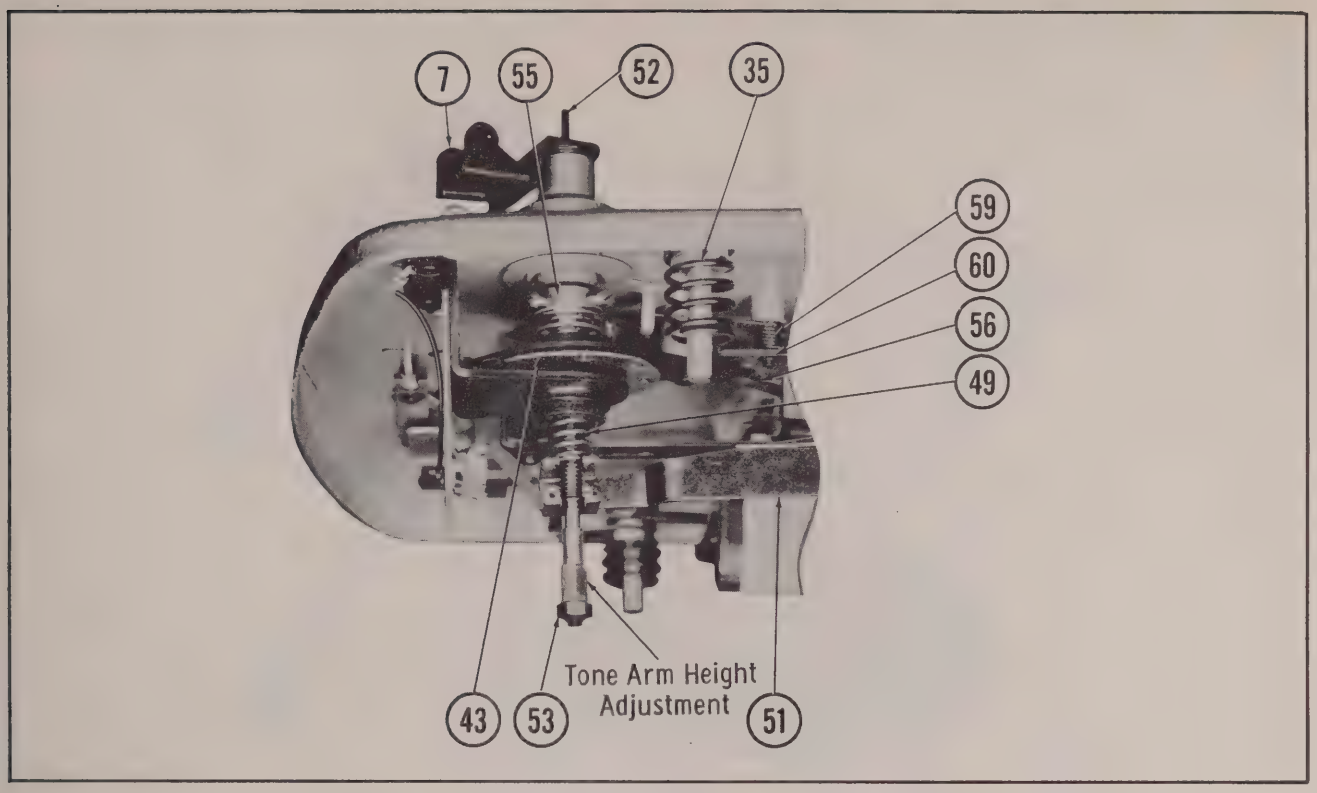


FIG. 5 TONE ARM OPERATING MECHANISM

AUTOMATIC SHUTOFF

After the last record has been played, the change cycle mechanism is disengaged. The tone arm swings out and then inward again. Since it finds no records in place to gauge, the friction coupling is not activated, and the tone arm swings in a greater distance than the diameter of the smallest record would allow. At the same time, return latch (55A) on return switch (55) rises along slant of the segment. Also, return lever (46) is swung out by means of the bolts on tooth gear (83), engaging return latch (55A), pushing it back until the tone arm hits starting key (11). Return lever (46) falls back into its starting position; the tone arm drops and is latched.

The crossbar (part of tone arm), through its own weight, pushes down switch latch (17). Switch bar (41) is released by starting bar (37). As a result, switch bar (41) returns to its original position and presses starting rod (13). The motor switch is opened and the friction wheel spring is tensed. The projection of starting key (11) now releases safety catch (16), which falls forward and stops the tone arm.

REMOVING EJECTION BAR

Ejection bar (76A) is locked into hollow shaft of turntable mount (76) and can be inserted or removed only with tooth gear (83) in its out-of-cycle position. Shortly before the out-of-cycle position, arresting bar (79), under the bridge of turntable mount (76) is pushed back far enough by the pin on cam mount (86) to release the bolt on the locking device. Bolt can now be removed from turntable mount (76).

ADJUSTMENTS

Tone Arm Height Adjustment

Press starting key (11) and rotate turntable until tone arm begins to swing inward. In this position, the distance between the upper edge of the feeler horn (part of tone arm) and the plate must be 2 3/4". Adjust tone arm by loosening hex nut (53) and turning adjustment screw of lifting spindle (52).

Tone Arm Friction Adjustment

The required tone arm friction, measured at the feeler horn, must be 25-30 grams. Regulate friction by adjusting deflection lever (56) on vertical shaft of support (7) with the two set screws provided for this adjustment.

Tone Arm Setdown Adjustment

Remove turntable. Turn tooth gear (83) by means of turntable driver pinion (28) until setdown adjustment (83C) appears through hole at rear of chassis plate. Setdown adjustment (83C) can be bent in or out with a screwdriver. If setdown adjustment (83C) is bent in, contact point of needle shifts to inside; if bent out, contact point of needle shifts to outside.

Tone Arm Pressure Adjustment

Tone arm pressure adjustment can be reached by removing tone arm casing (2). To adjust, turn screw counterclockwise to decrease tone arm pressure, clockwise to increase tone arm pressure.

Reject Adjustment

When tone arm has moved across record to a radius of about 2 3/8", the reject process begins. To

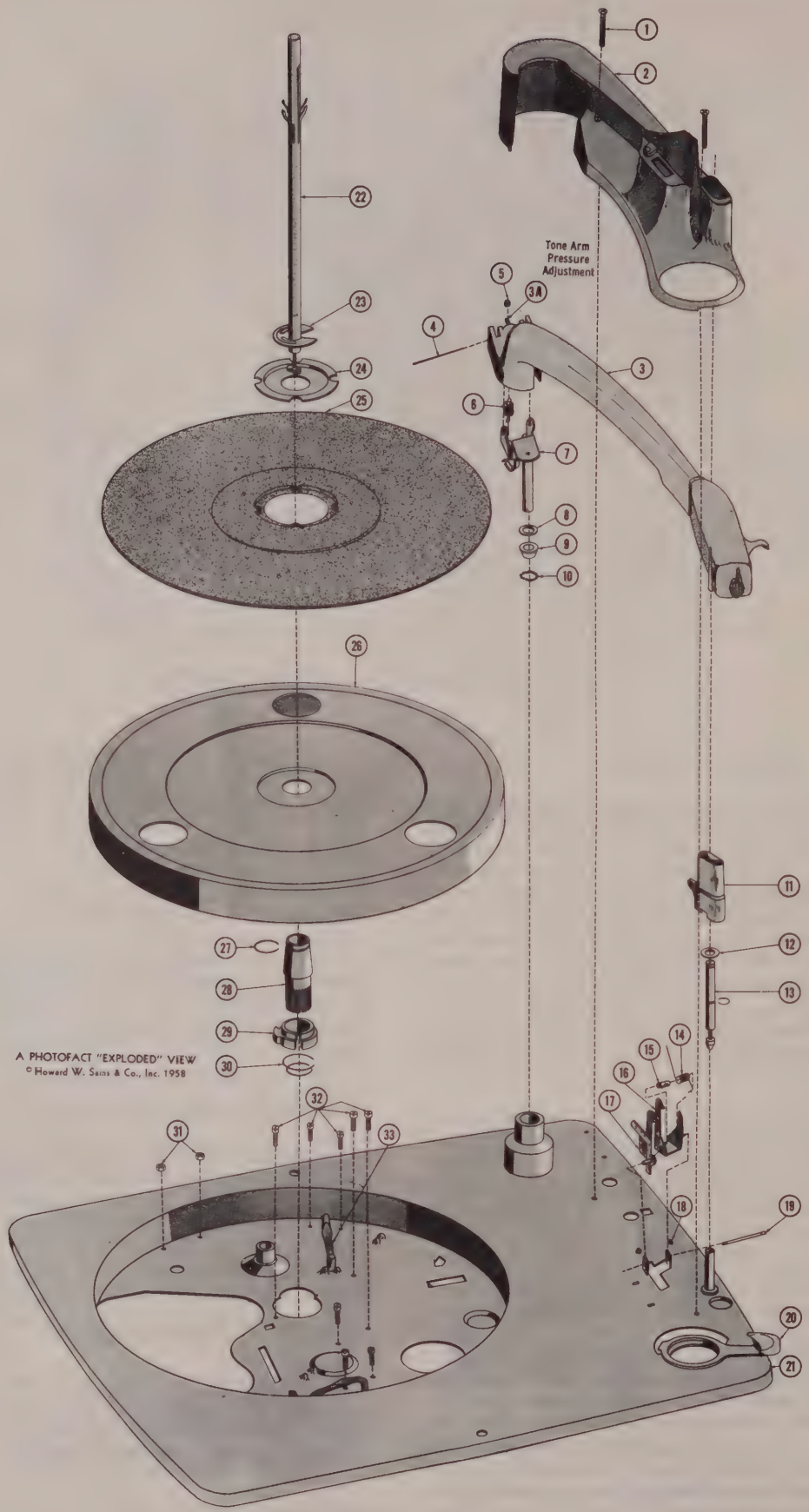
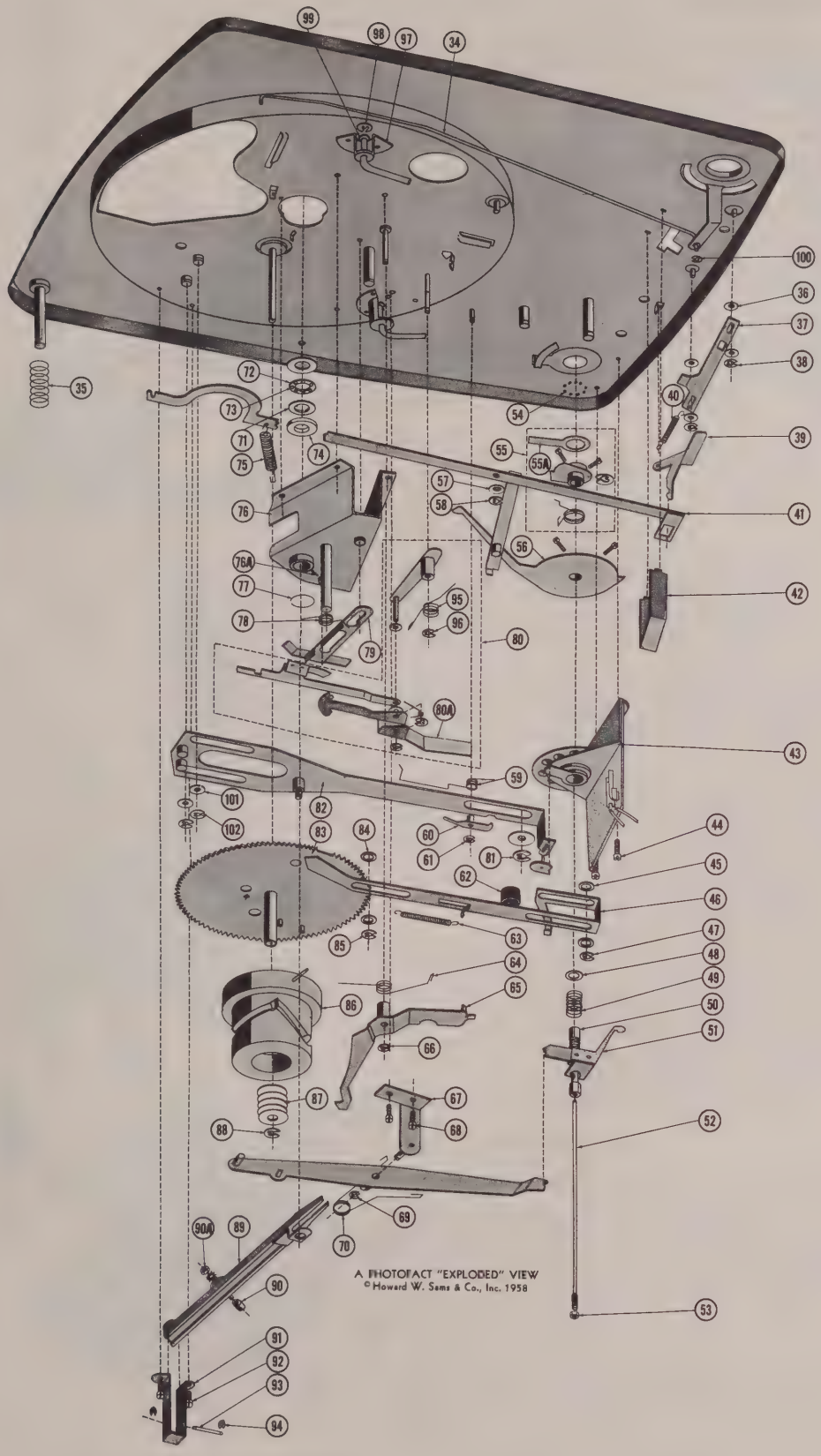


FIG. 6A EXPLODED VIEW OF PARTS ABOVE BASEPLATE



A PHOTOFACT "EXPLODED" VIEW
© Howard W. Sams & Co., Inc. 1958

FIG. 6B EXPLODED VIEW OF PARTS BELOW BASEPLATE

vary start of reject, bend bearing lever (80A) of recoil lever (80) forward or backward.

Controlling Cam Adjustment

In the out-of-cycle position of cam mount (86), tooth gap in tooth gear (83) must be distributed symmetrically against turntable drive pinion (28) by adjusting rocking lever (51) with its carrier (87). The carrier has slotted holes and can be moved either forward or backward, depending on the adjustment needed. Furthermore, note that rocking lever (51) must be pressed into deepest point of cam mount (86) by means of spring (70).

Record Dropping Adjustment

Release lever (89) adjustment is important for proper functioning of the spindle. Roller (90) on release lever (89) must be adjusted so release lever has a play of about 1/64". Adjust by loosening nut (90A) and turning roller.

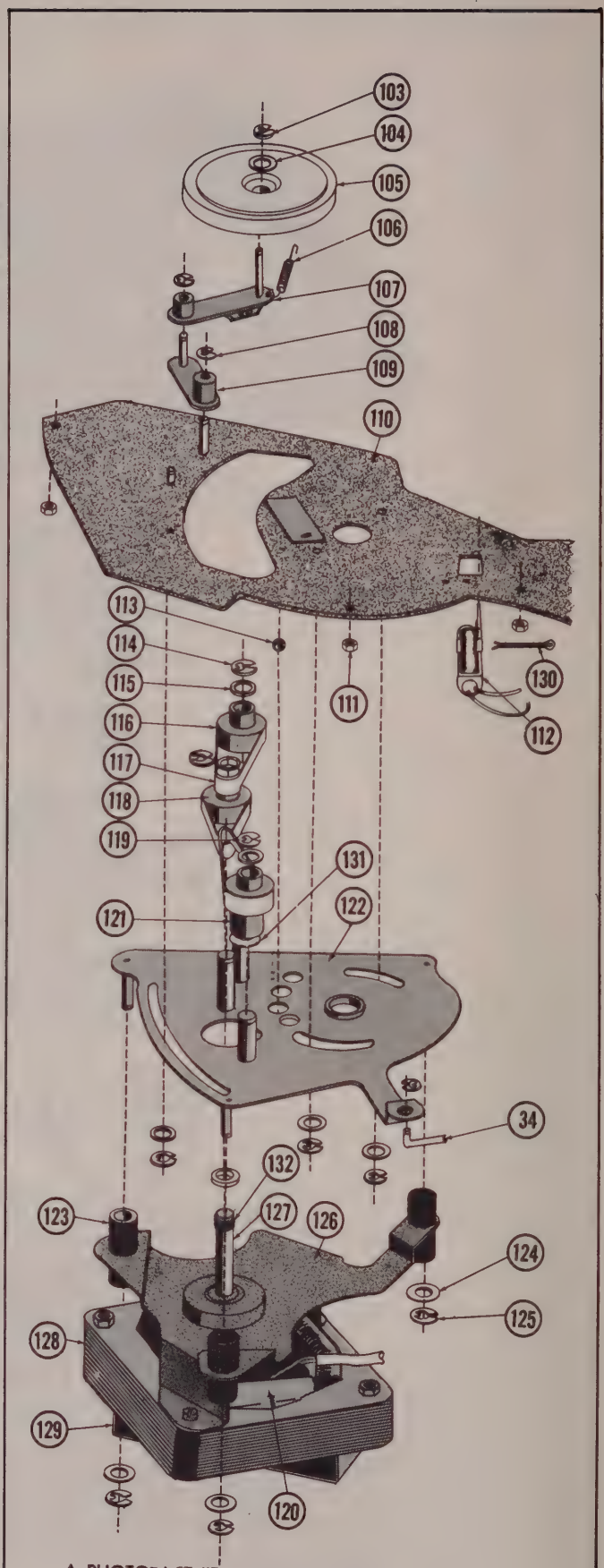


FIG. 6C MOTOR & MOUNTING ASSEMBLY

TROUBLE CHART

Symptom	Cause	Remedy
Turntable does not rotate when starting key (11) is pressed.	1. No current to motor.	1. (a) Check to see if current is reaching AC leads of changer. (b) Check to see if mercury switch (112) is functioning correctly. (c) Check all wiring and the solder terminals to and from mounting plate (110).
	2. Motor defective.	2. Remove turntable and allow motor to operate without load. If motor spindle is not rotating but AC current reaching the motor, motor is faulty and should be replaced.
	3. Friction wheel (105) not engaging turntable rim.	3. (a) Check friction wheel, must be free to pivot. (b) Check friction wheel spring (106), must be correctly positioned. (c) Carefully clean inside rim of turntable and rubber tire on friction wheel (105) to insure that they are free from oil and other foreign matter.
Noise while record is playing.	1. Faulty suspension of motor on rubber mountings (123), producing low-pitched rumble from loudspeaker.	1. Check motor rubber mounts (123); be sure motor is freely suspended on them. The motor lead wires should have slack to allow the motor to float freely.
	2. Defective turntable bearing or bearings.	2. Check for foreign matter in bearings (72); defective balls; binding between balls, ball race, and washers. Grease ball race and washers.
	3. Defective friction wheel.	3. A rapid thumping sound while the motor is running may indicate a flat spot on the friction wheel (105). Remove turntable and check rubber tire on friction wheel. If surface of rubber tire is not smooth, replace. If bearing of friction wheel shows signs of wear, replace friction wheel (105).
Distortion of recorded sound.	1. Defective record.	1. Worn or defective records cause needle scratch and distortion of recorded sound. If record is warped, it may slip on the other records, causing wow. An enlarged hole in the record can also cause wow.
	2. Defective amplifier.	2. Check both amplifier and speaker.
	3. Bad cartridge.	3. Replace.
	4. Dust on needle.	4. Wipe off dust with finger.
Turntable speed too slow.	1. Binding in turntable steel ball (73).	1. Check turntable steel ball (73); if it does not turn freely when disengaged from friction wheel (105), remove turntable, clean off foreign matter, and lubricate with light mineral oil.
	2. Friction wheel (105) slips.	2. Remove turntable and clean rim of friction wheel (105). Be sure to remove any trace of oil from friction wheel or inside of turntable.
	3. Voltage too low.	3. Voltage should be no less than 100 volts.
	4. Operating temperature too low.	4. If changer has been standing in a cold area or has been operated in surroundings of less than 45°F., turntable speed at the start may be too slow.

Symptom	Cause	Remedy
Record does not drop when changer cycles.	1. Release lever (89) improperly adjusted.	1. Adjust. (See "Record Dropping Adjustment").
	2. Roller (90) damaged.	2. Replace.
	3. Release spindle (22) defective.	3. Replace.
Needle does not track across record.	1. Needle may be clogged with dust, or it may be worn.	1. (a) Clean foreign matter from needle. (b) Replace needle if tip is broken or bent.
	2. Tone arm lead too tight.	2. Give tone arm lead enough slack to move across record.
	3. Changer not level.	3. Level changer.
	4. Binding or friction in support (7).	4. Be sure all moving parts and bearing surfaces in this assembly are free and lightly oiled.
	5. Insufficient needle pressure.	5. Check and adjust.
	6. Worn records, or records with damaged groove.	6. Replace record.
Tone arm does not locate correctly on records.	1. Tone arm not adjusted properly.	1. See "Tone Arm Setdown."
	2. Bent needle.	2. Replace.
Tone arm remains on last groove of record.	1. No fast finishing or run-out groove on record.	1. Check record for eccentric run-out groove in center of record, which some older records and home recordings do not have.
	2. Needle jumps out of groove in record.	2. (a) Check to see that needle pressure is correct. (b) Make sure record is not defective; the run-out groove may be too shallow. (c) Needle point may be damaged or have excessive accumulation of dust. Replace or clean. (d) There may be binding in support (7). Be sure all moving parts are free and lightly oiled.
Tone arm does not move in when set down on record.	1. No run-in groove on record.	1. Check to see if record is standard type with a run-in groove from outside edge of record recorded section. Some older records and home recordings do not have this run-in groove.
Four-speed control does not select 16, 33, 45, or 78 rpm when moved to that speed.	1. Connecting bar (34) loose.	1. Replace.
No sound.	1. Defective cartridge.	1. Replace.
	2. Defective wiring.	2. Check tone arm lead for short or open.
	3. Defective amplifier or speaker.	3. Check amplifier and speaker.
	4. Loose cartridge socket tip.	4. Remove, tighten slightly, and replace.

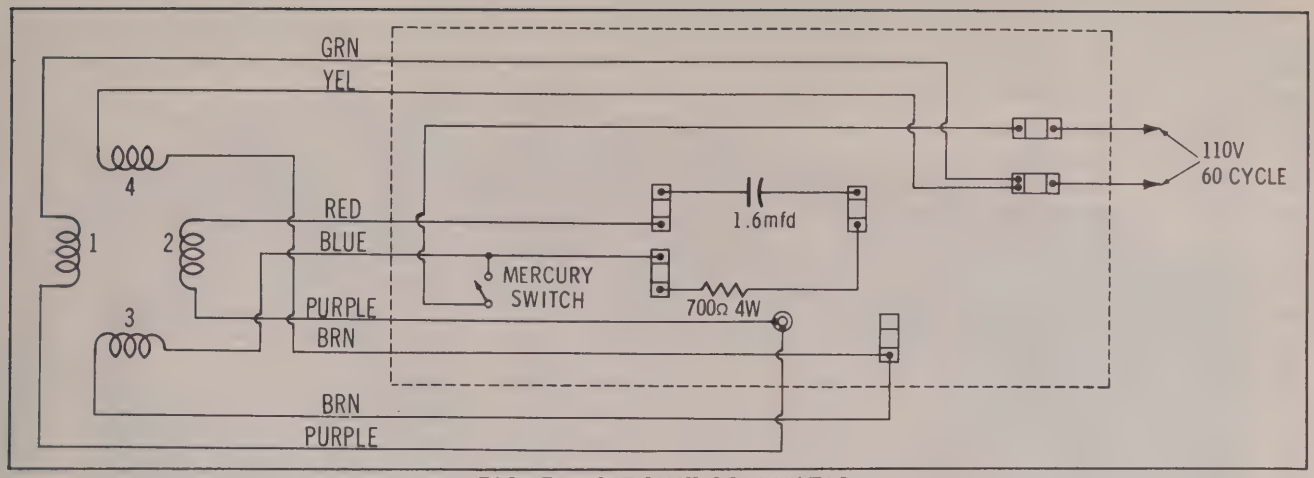


FIG. 7 CIRCUIT SCHEMATIC

MECHANICAL PARTS LIST

Ref. No.	Part No.	Description
1	13099	Fillister Head Screws M 3 x 4
2	13096	Tone Arm Casing
3	13074	Tone Arm
4	13093	Bearing Bolt
5		"C" Washer
6		Tone Arm Spring
7	13052	(Suspended) Support
8	13055	Shim (Compensating Washer)
9	13036	Upper Cone
10	13057	Steel Ball 2mm Dia.
11	13095	Starting Key
12	12713	Rubber Washer
13	12710	Starting Rod
14	12700	Spring
15		Sleeve
16	12699	Safety Catch
17	12687	Switch Latch
18	12701	Snap Ring 1.9
19	12702	Bearing Bolt for Latches
20	12528	Speed Changing Lever
21	12502	Chassis Plate
22	13200	Release Spindle 7mm Dia.
	13250	38mm or 45rpm Spindle "Rex Deluxe"
23	13165	Snap Ring 12
24	13164	Covering Washer
25	13163	Turntable Cover
26	13152	Turntable
27	12748	Wire Ring
28	12739	Turntable Driver Pinion
29	12742	Deflection Cam (Drift Cam)
30	12747	Wire Ring
31	12759	Hexagonal Nut
32	12540	Fillister Head Screw M 3 x 4
33	12536	Safety Lever
34	13010	Connecting Bar
35	12525	Suspension Spring
36	12705	Starting Rod Washer
37	12703	Starting Bar
38	12706	Snap Ring 2.3
39	12694	Starting Lever
40	12704	Starting Bar Tension Spring
41	12716	Switch Bar
42	12720	Stirrup Guard
43	12571	Arresting Stirrup with Coupling
44	12592	Fillister Head Screw M 3 x 5
45	12654	Washer

Ref. No.	Part No.	Description
46	12650	Return Lever
47	12655	Snap Ring
48	12682	Sliding Disc
49	12681	Pressure Spring
50	12680	Adjusting Bushing
51	12661	Rocking Lever
52	12679	Lifting Spindle
53	12683	Hex Nut N 4
54	13057	Steel Ball 2mm Dia.
55	13061	Return Switch
56	12544	Deflection Lever
57	12722	Washer
58	12723	Snap Ring 2.3
59	12566	Spring
60	12562	Return Latch
61	12567	Snap Ring 1.9
62	12657	Damping Rubber
63	12656	Tension Spring
64	12657C	Spring
65	12657A	Retarding Lever
66	12657D	Snap Ring 2.3
67	12670	Rocking Lever Carrier
68	12684	Fillister Head Screw M 3 x 4
69	12673	Snap Ring 4
70		Rocking Lever Spring
71	12736	Steel Washers
72	12737	Ball Race
73	12738	Steel Ball 2mm
74	12735	Damping Washer
75	12721	Tension Spring for Switch Bar
76	12728	Turntable Mount
77		Snap Ring
78	12741A	Arresting Bar Spring
79	12741	Arresting Bar
80	12596	Recoil Lever Complete
81	12558	Snap Ring 4
82	12552	Conveyor Lever
83	12622	Tooth Gear
84	12654	Washer
85	12655	Snap Ring 3.2
86	12641	Cam Mount
87	12646	Washer
88	12647	Hex Nut
89	12755	Release Lever
90	12763	Release Lever Roller
91	12753	Stirrup Bearing
92	12764	Fillister Head Screw M 3 x 4

Ref. No.	Part No.	Description
93	12760	Bearing Bolt
94	12761	Snap Ring 2. 3
95	12614	Recoil Lever Spring
96	12615	Snap Ring 2. 3
97	12537	Bearing Flange
98	12539	Snap Ring 3. 2
99	12538	Washers
100	13011	Snap Ring
101	12557	Bottom Washer
102	12558	Snap Ring 4
103	13007	Snap Ring 2. 3
104	13006	Washer
105	12998	Friction Wheel
106	13008	Friction Wheel Spring
107	12992	Friction Wheel Mount
108	13009	Snap Ring. 2. 3
109	12986	Friction Wheel Mount Lever
110	12947	Mounting Plate with Potential Divider & Mercury Switch -110/ 220V
	12947/ 1	Mounting Plate with Condenser & Mercury Switch -220V.
	12947/ 2	Mounting Plate with Potential Divider & Mercury Switch -110/ 125/ 160/ 220V
111		Hex Nuts
112	12978	Mercury Switch
113	13014	Steel Ball 5mm
114	12937	Snap Ring 1. 9
115	12936	Small Damping Washer
116	12926	Drive Shaft-16 2/ 3 rpm
117	12941	Drive Belts

Ref. No.	Part No.	Description
118	12929	Drive Shaft-33 1/ 3 rpm
119		Snap Ring
120	12810-46	One Complete Coil Unit-110/ 220V
	12810-46/ 1	One Complete Coil Unit-110 or 220V
	12810-46/ 2	One Complete Coil Unit-110/ 125/ 160/ 220V
121	12932	Drive Shaft-45 rpm
122	12918	Starting Lever without Shaft
123	12900	Rubber Mounts
124	12902	Washer
125	12903	Snap Ring 2. 3
126	12888	Upper Mount
127	12850	Armature
128	12801	Motor KM7-110/ 220V without Mounting Plate & Shaft
	12801/ 1	Motor KM7-110 or 220V without Mounting Plate & Shaft
	12801/ 2	Motor KM7-110/ 125/ 160/ 220V without Mounting Plate & Shaft
129	12860	Upper Mount
130	12982	Cotter Pin
131	12935	Large Damping Washer
132	12940/ 10	Motor Shaft 78-60 Cycles
133	12800	Motor KM7 Complete with Shaft & Commutator
	12800/ 1	Motor KM7 Complete with Shaft & Capacitor -110 or 220V.
	12800/ 2	Motor KM7 Complete 110/ 125/ 160/ 220V with Shaft & Commutator
		Motor KM6 Complete

PHOTOFACT* Folder

SILVERTONE MODELS 8228, 8229 (Ch. 132.43100)

SILVERTONE MODELS
8228, 8229 (Ch. 132.43100)

MODEL 8228

SILVERTONE MODELS
8228, 8229 (Ch. 132.43100)

TRADE NAME	Silvertone Models 8228, 8229 (Ch. 132. 43100)
MANUFACTURER	Sears, Roebuck & Co., 925 S. Homan Ave., Chicago, Illinois
TYPE SET	Battery Operated Portable AM Transistorized Receiver
POWER SUPPLY	9 Volts DC
TUNING RANGE—BROADCAST	540-1670 KC
RATING	9.6 MA @ 9 Volts DC (No Signal-MIN. Volume)
	28MA @ 9 Volts DC (Signal-Normal Volume)

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

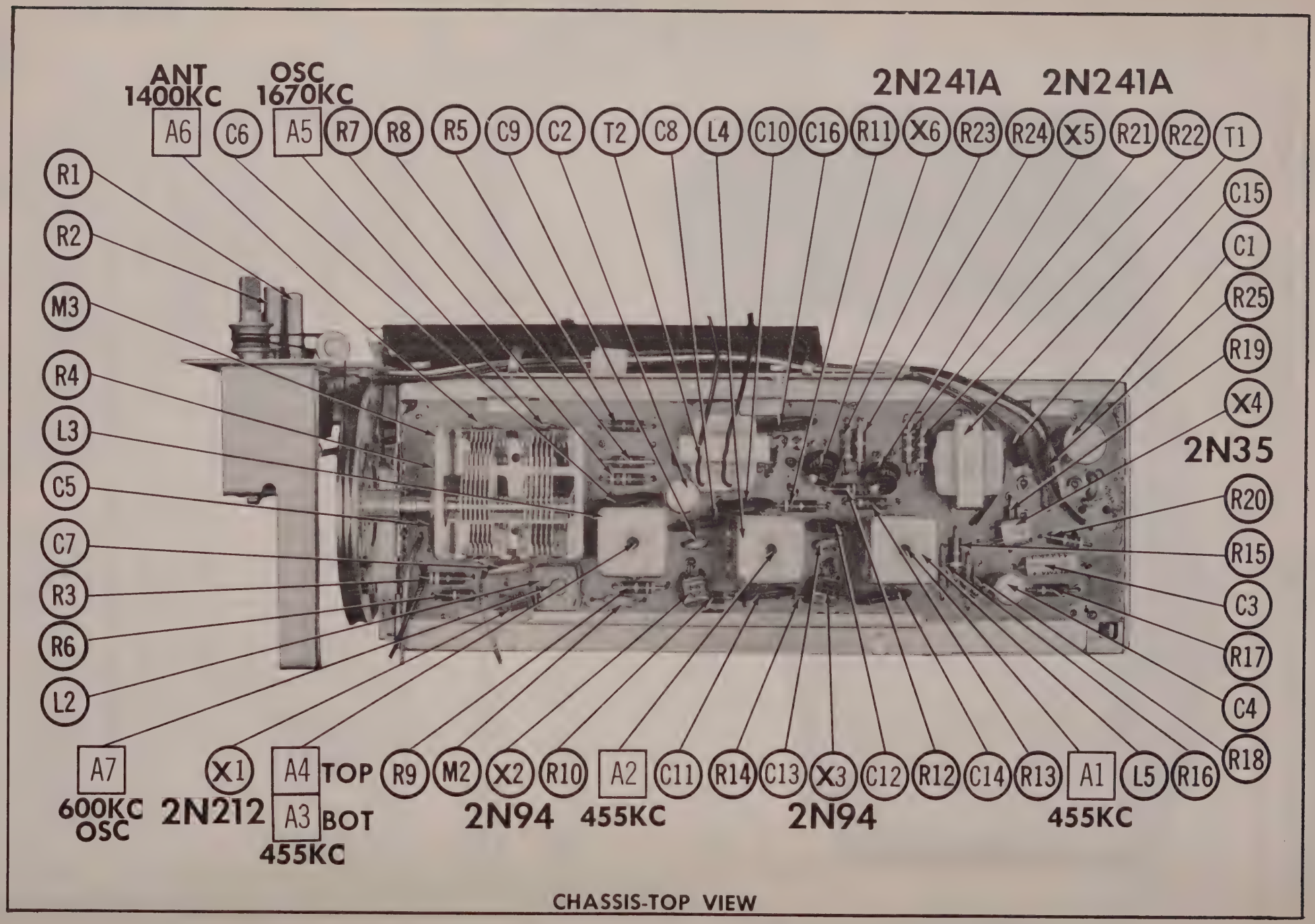
	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.	.05mf	High side to Ant. stator lug (front section of tuning cap) Low side to chassis.	455KC (400~ Mod)	Tuning gang fully open.	Across Voice Coil	A1, A2, A3, A4	Adjust for maximum output.
2.		Loop	1670KC	"	"	A5	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
3.		"	1400KC	1400KC	"	A6	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
4.		"	600KC	600KC	"	A7	"

HOWARD W. SAMS & CO., INC. • Indianapolis 5, Indiana

The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed. Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. © 1958 Howard W. Sams & Co., Inc., Indianapolis 5, Indiana. Printed in U.S. of America

H475

SET 409 FOLDER 15



CHASSIS-TOP VIEW

PARTS LIST AND DESCRIPTIONS

TRANSISTORS

ITEM No.	ORIG. TYPE	USE	REPLACEMENT DATA				NOTES
			CBS PART No.	RCA PART No.	RAYTHEON PART No.	SYLVANIA PART No.	
X1	2N212	Converter				2N212	
X2	2N94	1st IF Amplifier				2N94	
X3	2N94	2nd IF Amplifier				2N94	
X4	2N35	AF Amplifier				2N35	
X5	2N241A	Output		2N270		2N241A	Alt. 2N321
X6	2N241A	Output		2N270		2N241A	Alt. 2N321

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						
	CAP.	VOLT.	Silvertone PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1A	80	10	44397-2						R2514*
B	80	10							
C2	10	10	44279-6	XPP-10010	NL10-10	TT12X10	ML10-15		TE-1114
C3	4	10	44396-1	XPP-10004	NL5-15	TT12X5	ML4-15		R2453 *
C4	80	10	44279-7	XPP-10050	NL100-10		ML100-15		R2515*

* Non Catalog Item

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA						NOTES
	CAP.	VOLT	Silvertone PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	
C5	50000		43674-9	BPD-05	DF-503			5HK-S5	
C6	20000		43674-13	BPD-02	DD-203	BYB6S2		5HK-S2	
C7	10000		43674-11	BPD-01	DD-103	BYA10S1	DC511	5HK-S1	
C8	20000		43674-13	BPD-02	DD-203	BYB6S2		5HK-S2	
C9	9		43957-3			C10V9C			NP0 10%
C10	50000		43674-9	BPD-05	DF-503			5HK-S5	
C11	20000		43674-13	BPD-02	DD-203	BYB6S2		5HK-S2	
C12A	20000		43956	BPD-2X02	DD-203	BYB6S2		5HK-2S2	
B	20000				DD-203	BYB6S2			
C13	9		43957-3			C10V9C			NP0 10%
C14	20000		43674-13	BPD-02	DD-203	BYB6S2		5HK-S2	
C15	560		43674-12	BPD-00056	DD-561	L10T56	UC5356	5GA-T56	
C16	50000		43674-9	BPD-05	DF-503			5HK-S5	①

①Some versions may use 20000mmf in this application (Part# 43674-13)

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	Silvertone PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	
R1A	5000Ω	½	4500-1	B-11		Q13-114	U12	Volume
B	Shaft			Not Req.		Not Req.	Not Req.	
C	Switch			KB-1orKR-1*		76-1	US-26	
R2A	1.5meg	½	4500-2	B-76	A47-2meg-2	Q13-139	U155	Tone
B	Shaft			Not Req.	FS-3	Not Req.	Not Req.	

*Use KR with CRL"red label" controls and KB with "blue label" controls.

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING		Silvertone PART No.	NOTES
	OHMS	WATT		
R3	3900Ω 5%		45052-392	
R4	68K 5%		44052-683	
R5	5600Ω 5%		44052-562	
R6	1500Ω		43689-152	
R7	47K 5%		44052-473	
R8	5600Ω 5%		44052-562	
R9	3300Ω		43689-332	
R10	820Ω 5%		44052-821	
R11	4700Ω		43689-472	
R12	68K 5%		44052-683	
R13	1000Ω		43689-102	
R14	470Ω		43689-471	

ITEM No.	RATING		Silvertone PART No.	NOTES
	OHMS	WATT		
R15	3900Ω 5%		45052-392	
R16	220Ω		43687-221	
R17	1000Ω		43689-102	
R18	6800Ω		43689-682	
R19	39K		43689-393	
R20	470Ω		43689-471	
R21	3300Ω		43689-332	
R22	47Ω		43689-470	
R23	10Ω		43689-100	
R24	10Ω		43689-100	
R25	220Ω		43687-221	

PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (DRIVER)

ITEM No.	TURNS RATIO		REPLACEMENT DATA							NOTES
	PRI.	SEC.	Silvertone PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T1	1.2	:1	44672							

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA							NOTES
	PRI.	SEC.	Silvertone PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T2	260Ω CT	3-4Ω	44671					TR-22 ①	TY-57X①	①Use original channel frame.

SPEAKER

ITEM No.	TYPE			REPLACEMENT DATA		NOTES
	SIZE	FIELD	V. C. IMP.	Silvertone PART No.	QUAM PART No.	
SP1	4"	PM	6-8Ω	44088	4A06Z8.1	Parallel and Phase
SP2	4"	PM	6-8Ω	44088	4A06Z8.1	

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA					NOTES
		Silvertone PART No.	Meissner PART No.	Merit PART No.	Miller PART No.	Ram PART No.	
L1	Loop Stick	45118-8*					Model 8228
	Loop Stick	45118-7*					Model 8229
L2	Osc. Coil	44383-4					
L3	1st IF	44674					
L4	2nd IF	44675					
L5	3rd IF	44676					Includes crystal & cap.

*Includes cabinet back.

BATTERIES

ITEM No.	VOLTAGE	Silvertone PART No.	REPLACEMENT DATA								NOTES
			BURGESS		EVEREADY		MALLORY		RAY-O-VAC		
			"A"	"B"	"A"	"B"	"A"	"B"	"A"	"B"	
M1	9V	6420		D6P1		2506		M1601		1601	

CRYSTAL DIODES

ITEM No.	ORIG. TYPE	REPLACEMENT DATA			NOTES
		Silvertone PART No.	CBS PART No.	SYLVANIA PART No.	
M2	1N295	43959	IN60	IN60	Pigtail Leads.

MISCELLANEOUS

ITEM No.	PART NAME	Silvertone PART No.	NOTES
M3	Tuning Cap.	45039	2 gang, (Ant. 16-190mmf)

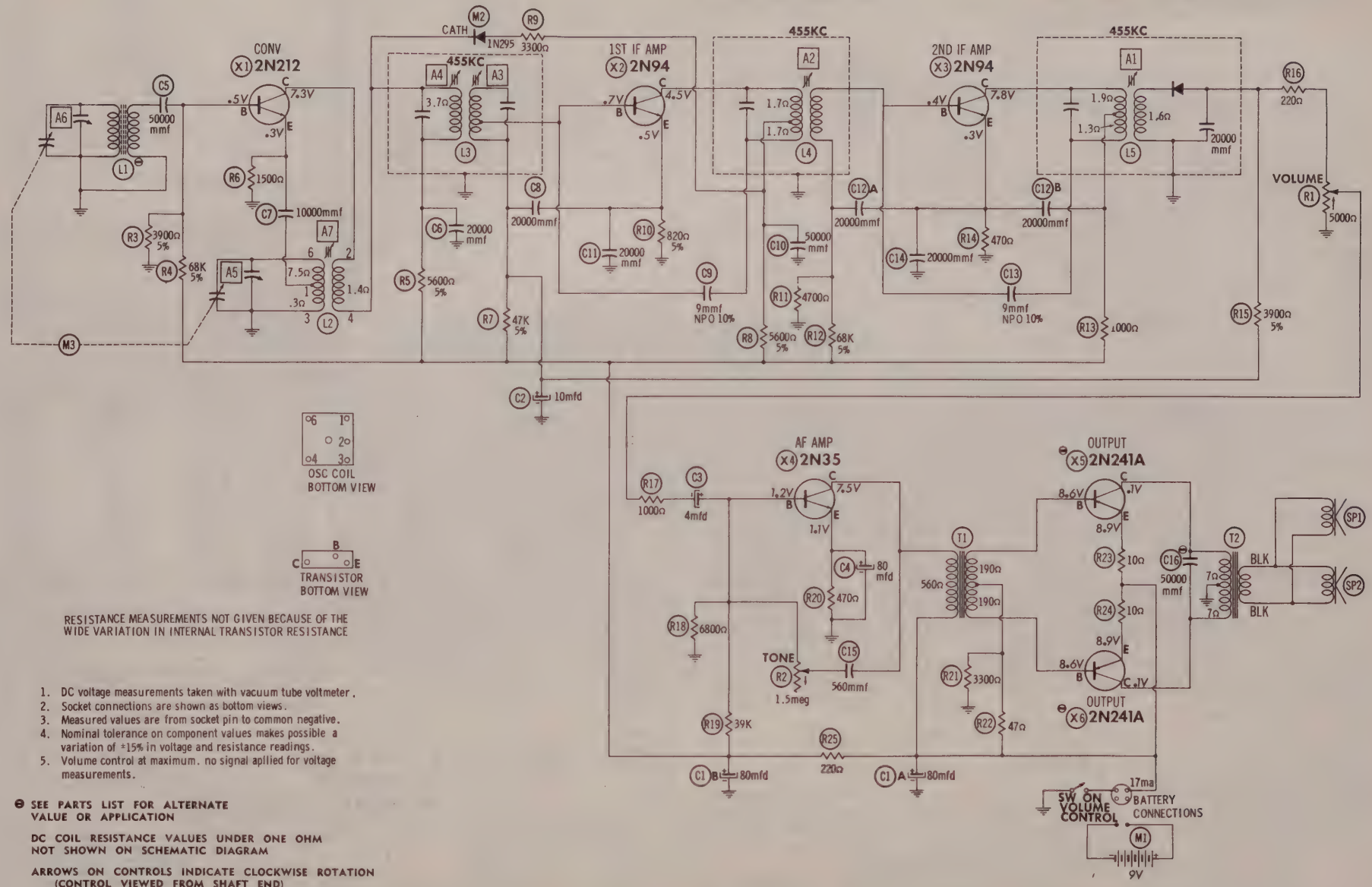
CABINETS & CABINET PARTS

(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

NAME	PART NO.	DESCRIPTION
Dial Glass	45095-1	
Dial Pointer	45074	
Knob	44903-48	On-Off-Volume, Brown, Model 8228
Knob	44903-17	On-Off-Volume, Ivory, Model 8229
Knob	44904-48	Tone, Brown, Model 8228
Knob	44904-17	Tone, Ivory, Model 8229
Knob	44905-48	Tuning, Brown, Model 8228
Knob	44905-17	Tuning, Ivory, Model 8229

WIRING DATA

General-use Unshielded Hook-up Wire .....Use BELDEN No. 8530 (Solid) Available in Ten Colors
8524 (Stranded) Available in Ten Colors



RESISTANCE MEASUREMENTS NOT GIVEN BECAUSE OF THE WIDE VARIATION IN INTERNAL TRANSISTOR RESISTANCE

1. DC voltage measurements taken with vacuum tube voltmeter.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Nominal tolerance on component values makes possible a variation of ±15% in voltage and resistance readings.
5. Volume control at maximum. no signal apllied for voltage measurements.

⊖ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM

ARROWS ON CONTROLS INDICATE CLOCKWISE ROTATION (CONTROL VIEWED FROM SHAFT END)

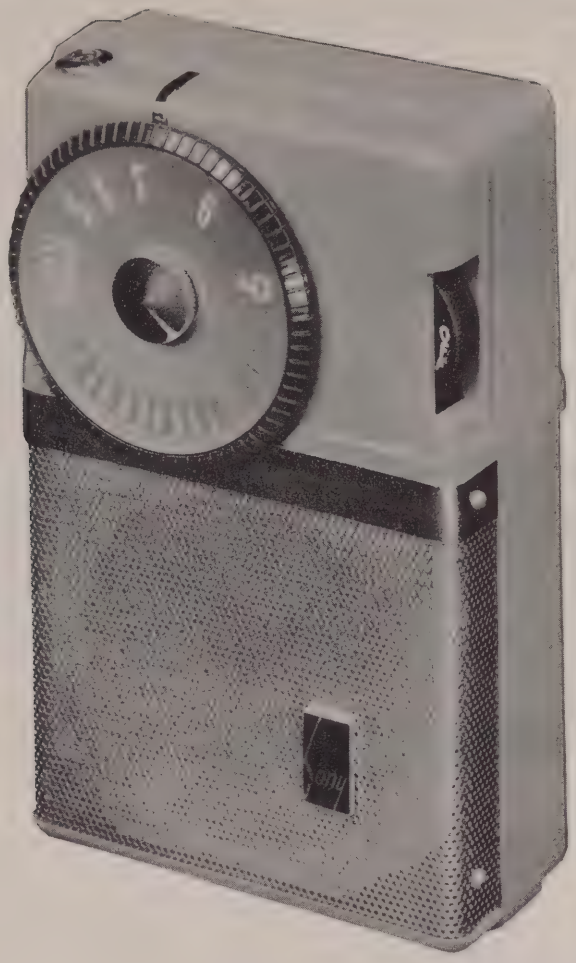
A PHOTOFACT STANDARD NOTATION SCHEMATIC
Howard W. Sams & Co., Inc. 1958

PHOTOFACT* Folder

EIA MEMBER ELECTRONIC INDUSTRIES ASSOCIATION

SONY MODEL TR-63

SONY MODEL TR-63



SONY MODEL TR-63

TRADE NAME	Sony Model TR-63
SUPPLIER	Delmonico International Sales Corp., 42-24 Orchard St., Long Island City, N.Y.
TYPE SET	Battery Operated Portable AM Transistorized Receiver
POWER SUPPLY	9 Volts DC
RATING	5.4 MA @ 9 Volts DC (No Signal, MIN Volume) 6.8MA @ 9 Volts DC (Signal, Normal Volume)
TUNING RANGE—BROADCAST	535-1620KC

ALIGNMENT INSTRUCTIONS

ALIGNMENT INSTRUCTIONS—READ CAREFULLY BEFORE ATTEMPTING ALIGNMENT

Volume control should be at maximum position. Output of signal generator should be no higher than necessary to obtain an output reading. Use an insulated alignment screwdriver for adjusting.

	DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	RADIO DIAL SETTING	OUTPUT METER	ADJUST	REMARKS
1.		Loop	455KC (400~ Mod.)	Tuning gang fully open	Across Voice Coil	A1, A2, A3	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.
2.		"	1600KC	1600KC	"	A4	"
3.		"	600KC	600KC	"	A5	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output. Repeat Steps 2 & 3.
4.		"	1400KC	1400KC	"	A6	Fashion loop of several turns of wire and radiate signal into loop of receiver. Adjust for maximum output.

HOWARD W. SAMS & CO., INC. • Indianapolis 5, Indiana

The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of the particular type of replacement part listed. Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. © 1958 Howard W. Sams & Co., Inc., Indianapolis 5, Indiana. Printed in U.S. of America

PARTS LIST AND DESCRIPTIONS

SONY MODEL TR-63

TRANSISTORS

ITEM No.	ORIG. TYPE	USE	REPLACEMENT DATA				NOTES
			CBS PART No.	RCA PART No.	RAYTHEON PART No.	SYLVANIA PART No.	
X1	2T513	Converter	CBS-2N439			2N194	
X2	2T524	1st IF Amplifier	CBS-2N438			2N216	
X3	2T524	2nd IF Amplifier	CBS-2N438			2N216	
X4	2T65	Driver	CBS-2N438			2N213	
X5	2T66	Output	CBS-2N438			2N214	
X6	2T66	Output	CBS-2N438			2N214	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING		REPLACEMENT DATA						
	CAP.	VOLT.	SONY PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1	30	6		PWE6030		TT6X30	ML30-6		TE-1092
C2	30	6		PWE6030		TT6X30	ML30-6		TE-1092
C3	3	6		XPP-6003	NL3-6	TT6X2			TE-1082
C4	12	15		XPP-15015	NL10-15	TT15X12			TE-1156
C5	30	6		PWE6030		TT6X30	ML30-6		TE-1092

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA						NOTES
	CAP.	VOLT	SONY PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	
C6	20000			BPD-02	DD-203	BYB6S2		5HK-S2	
C7	200			1468-0002	DD-201	5W5T2	UC-532	1FM-32	
C8	20000			BPD-02	DD-203	BYB6S2		5HK-S2	
C9	5000			BPD-005	DD-502	BYA10D5	DC525	5HK-D5	
C10	2								
C11	200			1468-0002	DD-201	5W5T2	UC-532	1FM-T2	
C12	2								
C13	200			1468-0002	DD-201	5W5T2	UC-532	1FM-T2	
C14	40000								Note 1.
C15	10000			BPD-01	DD-103	BYA6S1	DC511	5HK-S1	
C16	20000			BPD-02	DD-203	BYB6S2		5HK-S2	

Note 1. Some versions may use .02mfd in this application.

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESISTANCE	WATTS	SONY PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	
R1	5000Ω	1/4						Volume & Switch

RESISTORS

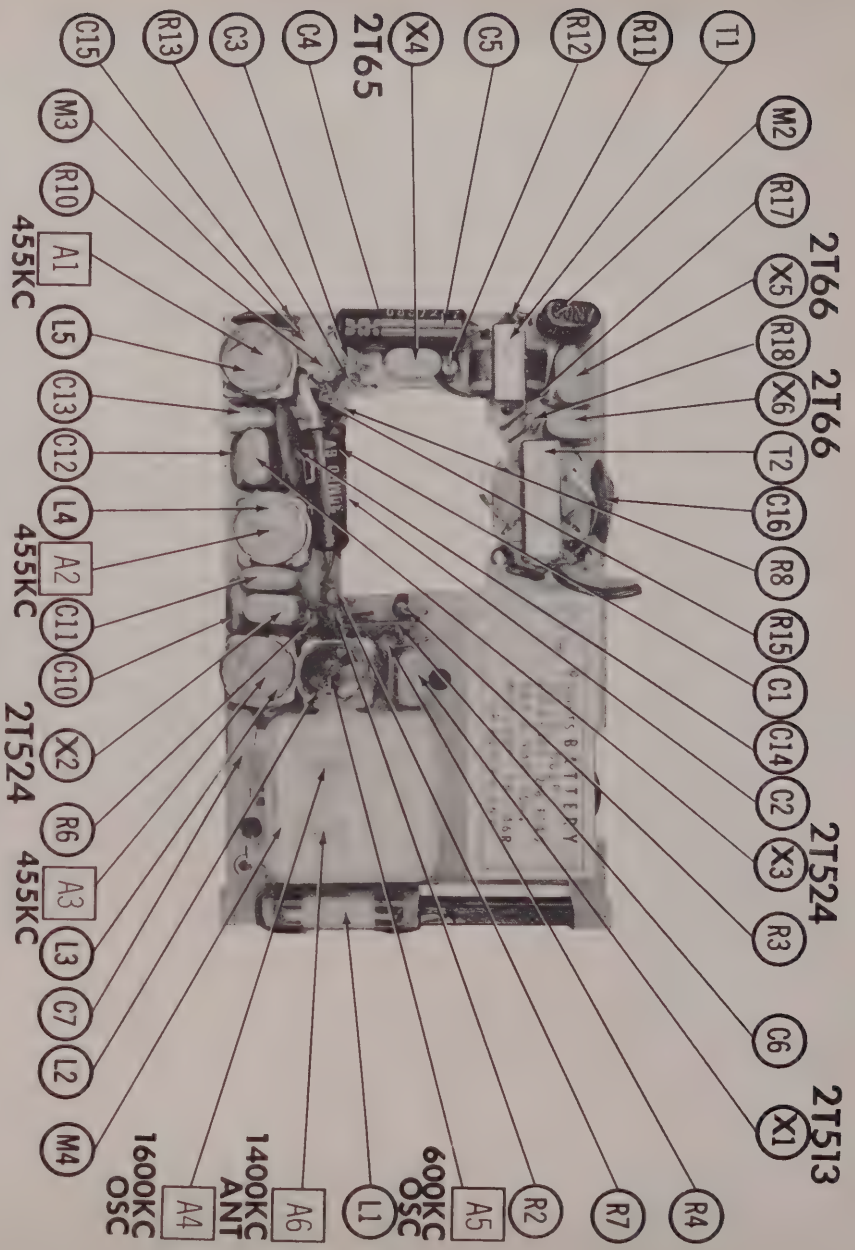
All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING		SONY PART No.	NOTES
	OHMS	WATT		
R2	56K			
R3	10K			
R4	1500Ω			
R5	10Ω			
R6	56K			
R7	27K			
R8	3300Ω			
R9	220Ω			
R10	1500Ω			

ITEM No.	RATING		SONY PART No.	NOTES
	OHMS	WATT		
R11	220Ω			
R12	27K			
R13	7500Ω			
R14	220Ω			
R15	1500Ω			Note 1.
R16	27K			
R17	42Ω			
R18	42Ω			

Note 1. Some versions may use 42K in this application

CHASSIS—TOP VIEW



PARTS LIST AND DESCRIPTIONS (Continued)

TRANSFORMER (DRIVER)

ITEM No.	TURNS RATIO		REPLACEMENT DATA							NOTES
	PRI.	SEC.	SONY PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T1	1.5	:1	TR63T1							

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE		REPLACEMENT DATA							NOTES
	PRI.	SEC.	SONY PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	
T2	6200Ω CT	10Ω	TR63T2							

SPEAKER

ITEM No.	TYPE			REPLACEMENT DATA		NOTES
	SIZE	FIELD	V. C. IMP.	SONY PART No.	QUAM PART No.	
SP1	2 1/4"	PM	10Ω	58886		

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA					
		SONY PART No.	Meissner PART No.	Merit PART No.	Miller PART No.	Ram PART No.	NOTES
L1 L2 L3 L4 L5	Loop Stick Osc. Coil 1st IF 2nd IF 3rd IF	LA-461-6E					

BATTERIES

ITEM No.	VOLTAGE	SONY PART No.	REPLACEMENT DATA								NOTES
			BURGESS		EVEREADY		MALLORY		RAY-O-VAC		
			"A"	"B"	"A"	"B"	"A"	"B"	"A"	"B"	
M1	9V	BL-006		2U6		216		TR-146R		1604	

CRYSTAL DIODES

ITEM No.	ORIG. TYPE	REPLACEMENT DATA			NOTES
		SONY PART No.	CBS PART No.	SYLVANIA PART No.	
M2	1T43				Detector (Pigtail)
M3	SD46				Bias Det. (Pigtail)

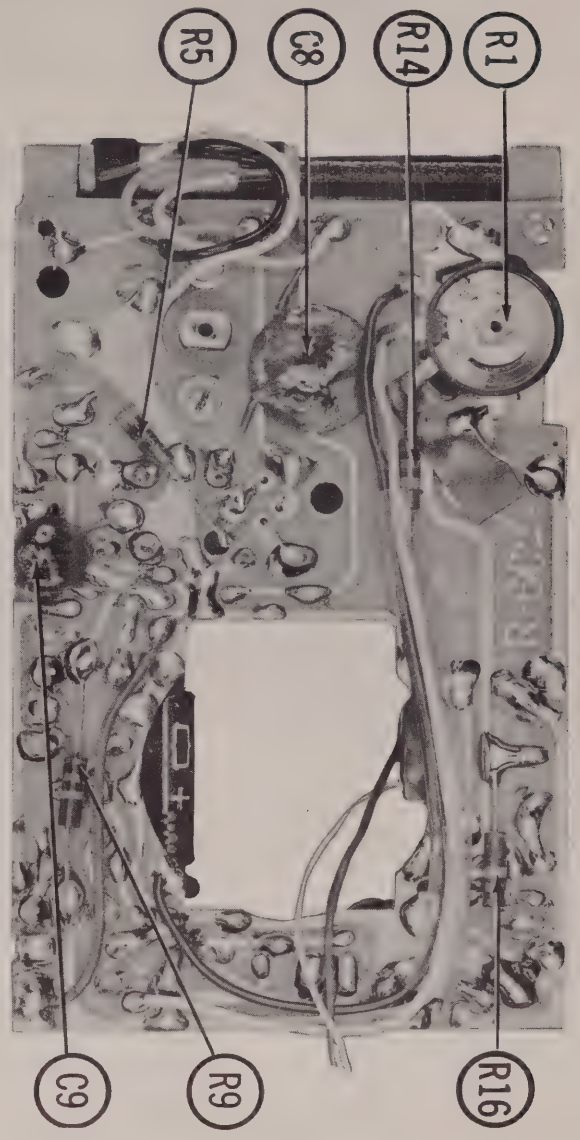
MISCELLANEOUS

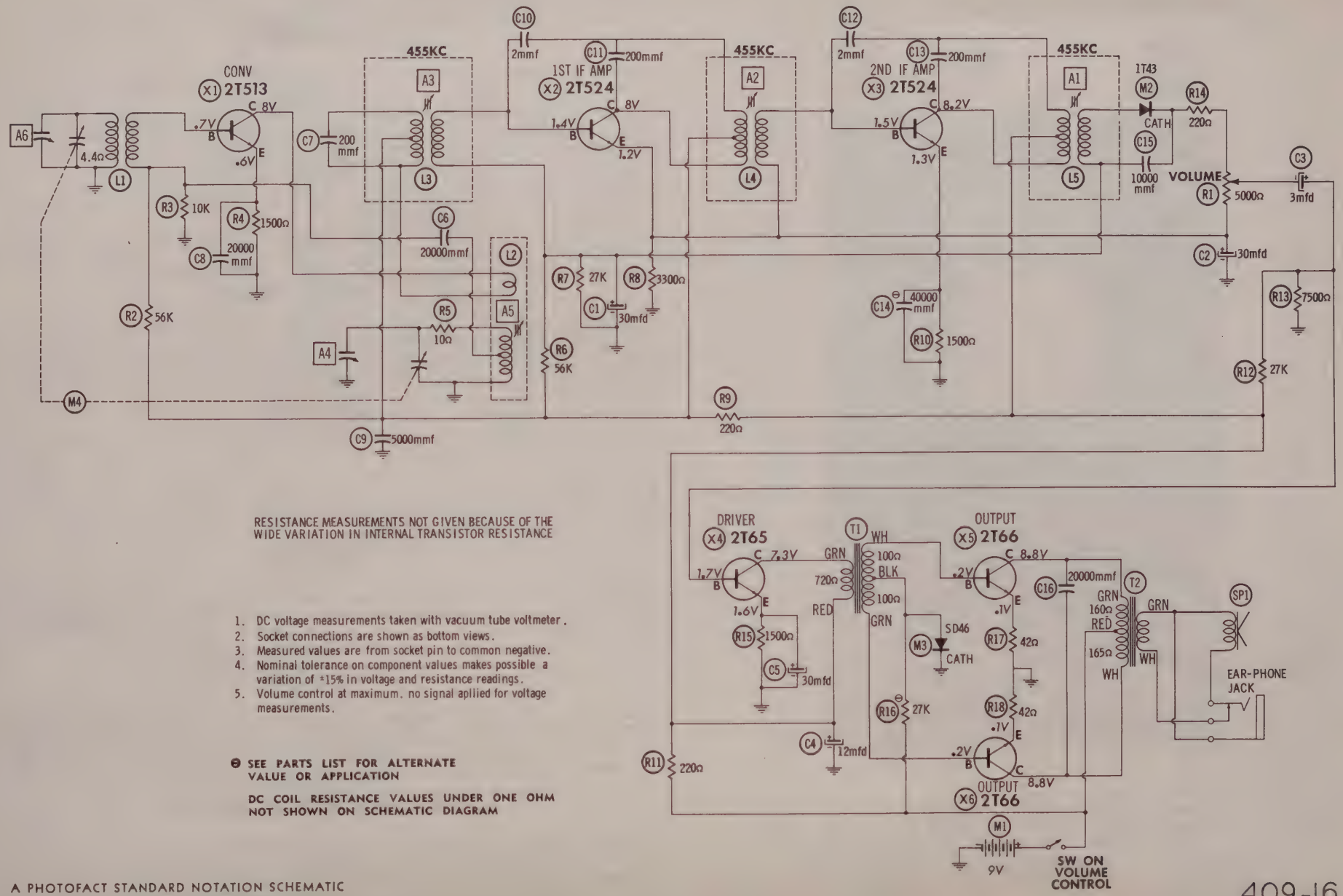
ITEM No.	PART NAME	SONY PART No.	NOTES
M4	Tuning Cap.		Ant. 21-206mmf Osc. 15-90mmf.
	Printed Board	R-6C2B	

WIRING DATA

General-use Unshielded Hook-up Wire .....Use BELDEN No. 8530 (Solid) Available in Ten Colors
8524 (Stranded) Available in Ten Colors

CHASSIS—BOTTOM VIEW





RESISTANCE MEASUREMENTS NOT GIVEN BECAUSE OF THE WIDE VARIATION IN INTERNAL TRANSISTOR RESISTANCE

1. DC voltage measurements taken with vacuum tube voltmeter.
2. Socket connections are shown as bottom views.
3. Measured values are from socket pin to common negative.
4. Nominal tolerance on component values makes possible a variation of ±15% in voltage and resistance readings.
5. Volume control at maximum. no signal aplied for voltage measurements.

⊖ SEE PARTS LIST FOR ALTERNATE VALUE OR APPLICATION

DC COIL RESISTANCE VALUES UNDER ONE OHM NOT SHOWN ON SCHEMATIC DIAGRAM

A PHOTOFACT STANDARD NOTATION SCHEMATIC

© Howard W. Sams & Co., Inc. 1958

409-16

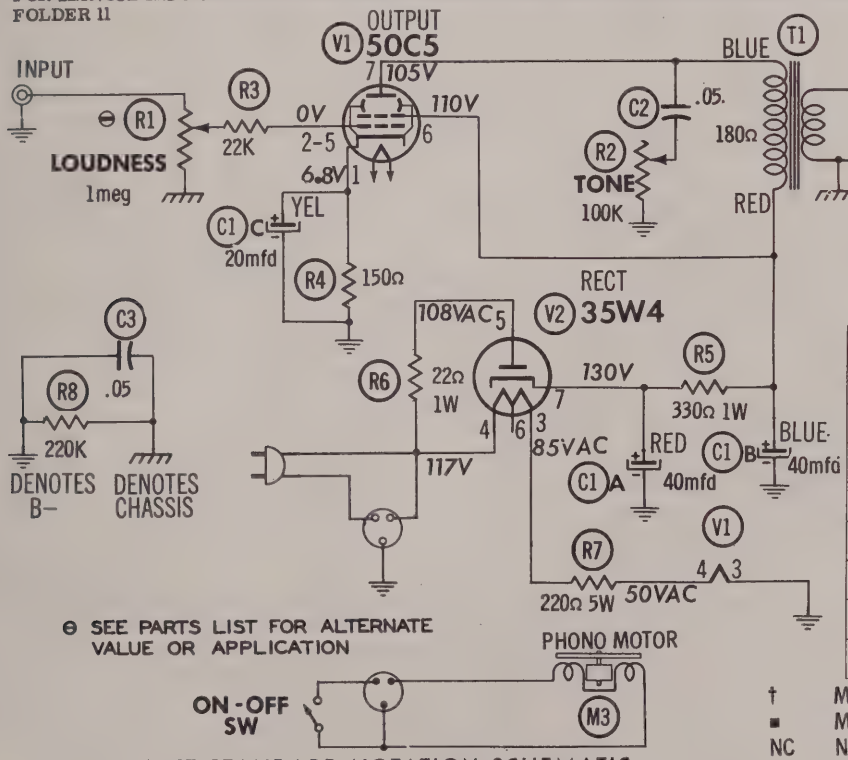
PHOTOFACT* Folder

STEELMAN MODEL 4A20

STEELMAN MODEL 4A20

TRADE NAME	Steelman Model 4A20
MANUFACTURER	Steelman Phono & Radio Co., Inc., 12-30 Anderson Ave., Mt. Vernon, N. Y.
TYPE SET	AC Operated Phono Amplifier With 4 Speed Automatic Record Changer
TUBES (Two)	Types 50C5 Output, 35W4 Rectifier
POWER SUPPLY	110-120 Volts AC-60 Cycles RATING .26 Amp. @ 117 Volts AC (26 Watts Without Motor)

FOR SERVICE INFORMATION ON RECORD CHANGER—SEE SIMILAR MONARCH MODEL UA8—PHOTOFACT SET 381 FOLDER 11



Pin No.	V1	V2
1	150Ω	NC
2	■22K	NC
3	0Ω	270Ω
4	50Ω	290Ω
5	■22K	310Ω
6	†330Ω	280Ω
7	†510Ω	20K(Min)

† MEASURED FROM PIN 7 OF V2
■ MEASURED FROM CHASSIS
NC NO CONNECTION

A PHOTOFACT STANDARD NOTATION SCHEMATIC

Howard W. Sams & Co., Inc. 1958

HOWARD W. SAMS & CO., INC. • Indianapolis 5, Indiana

The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of H328

the particular type of replacement part listed. Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. © 1958 Howard W. Sams & Co., Inc., Indianapolis 5, Indiana. Printed in U.S. of America

SET 409 FOLDER 17

PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V1	Output	50C5	

ITEM No.	USE	TYPE	NOTES
V2	Rectifier	35W4	

ELECTROLYTIC CAPACITORS

ITEM No.	RATING CAP.	RATING VOLT.	REPLACEMENT DATA STEELMAN PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1A	40	150	EC442	PRS150V4040	BBRT44215	TCT3116	TDLT-4	FMT-312	TVA-3448
B	40	150		20					
C	20	150							

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING CAP.	RATING VOLT	REPLACEMENT DATA STEELMAN PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	NOTES
C2	.05	400		P488N-05	DF-503	CUB4S5	GEM-415	4TM-S5	
C3	.05	600		P688N-05	DF-503	CUB6S5	GEM-615	6TM-S5	

CONTROLS

ITEM No.	RATING RESISTANCE	RATING WATTS	REPLACEMENT DATA STEELMAN PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	INSTALLATION NOTES	
R1A	1meg	½	VC-64	B-70	A47-1meg-Z	Q13-133	U53	Loudness	(Note 1)
B	Shaft			Not Req.	KSS-3	Not Req.	Not Req.		
R2A	100K	½	360250	B-41	A47-100K-Z	Q13-128	U39	Tone	
B	Shaft			Not Req.	KSS-3	Not Req.	Not Req.		

Note 1. A 1meg Control with Switch may be used in some versions (Part #360280).

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING OHMS	RATING WATT	STEELMAN PART No.	NOTES
R3	22K			
R4	150Ω			
R5	330Ω	1		

ITEM No.	RATING OHMS	RATING WATT	STEELMAN PART No.	NOTES
R6	22Ω	1		
R7	220Ω	5	510007	
R8	220K			

TRANSFORMER (AUDIO OUTPUT)

ITEM No.	IMPEDANCE PRI.	IMPEDANCE SEC.	REPLACEMENT DATA STEELMAN PART No.	Halldorson PART No.	Merit PART No.	Ram PART No.	Stancor PART No.	Thordarson PART No.	Triad PART No.	NOTES
T1	2600Ω	3-4Ω	430202	Z1101	A-3025	AU-605	A-3332	24S53	S-12X	

SPEAKER

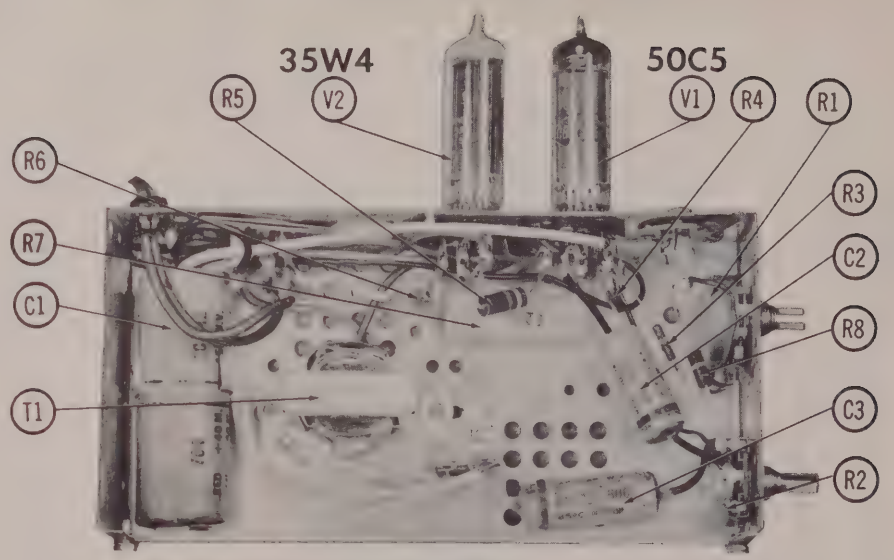
ITEM No.	TYPE SIZE	TYPE FIELD	TYPE V. C. IMP.	REPLACEMENT DATA STEELMAN PART No.	QUAM PART No.	NOTES
SP1	4"	PM	3-4Ω	404003	4A07	

PHONO CARTRIDGE

ITEM No.	REPLACEMENT DATA STEELMAN PART No.	ASTATIC PART No. CARTRIDGE	ASTATIC PART No. NEEDLE	ELECTRO-VOICE PART No. CARTRIDGE	ELECTRO-VOICE PART No. MOUNT	REMARKS
M1	322509	420TS	N8-1 & N8-3			

ASTATIC NEEDLE LISTING SHOWN ABOVE IS SPECIFIED FOR THE RESPECTIVE REPLACEMENT CARTRIDGE LISTED. FOR ORIGINAL CARTRIDGE NEEDLE REPLACEMENTS SEE BELOW.

CHASSIS—BOTTOM VIEW



PHONO NEEDLE

(FOR REPLACEMENT IN ORIGINAL EQUIPMENT CARTRIDGE)

ITEM No.	REPLACEMENT DATA STEELMAN PART No.	JENSEN PART No.	WALCO PART No.	REMARKS
M2	329307 (78RPM)	† CRA-55 or ♦ CRA-55D	† W64S or ♦ W64D	† Jewel ♦ Diamond
	329107 (LP)	† CRA-55LP or ♦ CRA-55LPD	† W64MGS or ♦ W64MGD	

MISCELLANEOUS

ITEM No.	PART NAME	STEELMAN PART No.	NOTES
M3	Phono Motor	8M/59	

CABINETS & CABINET PARTS

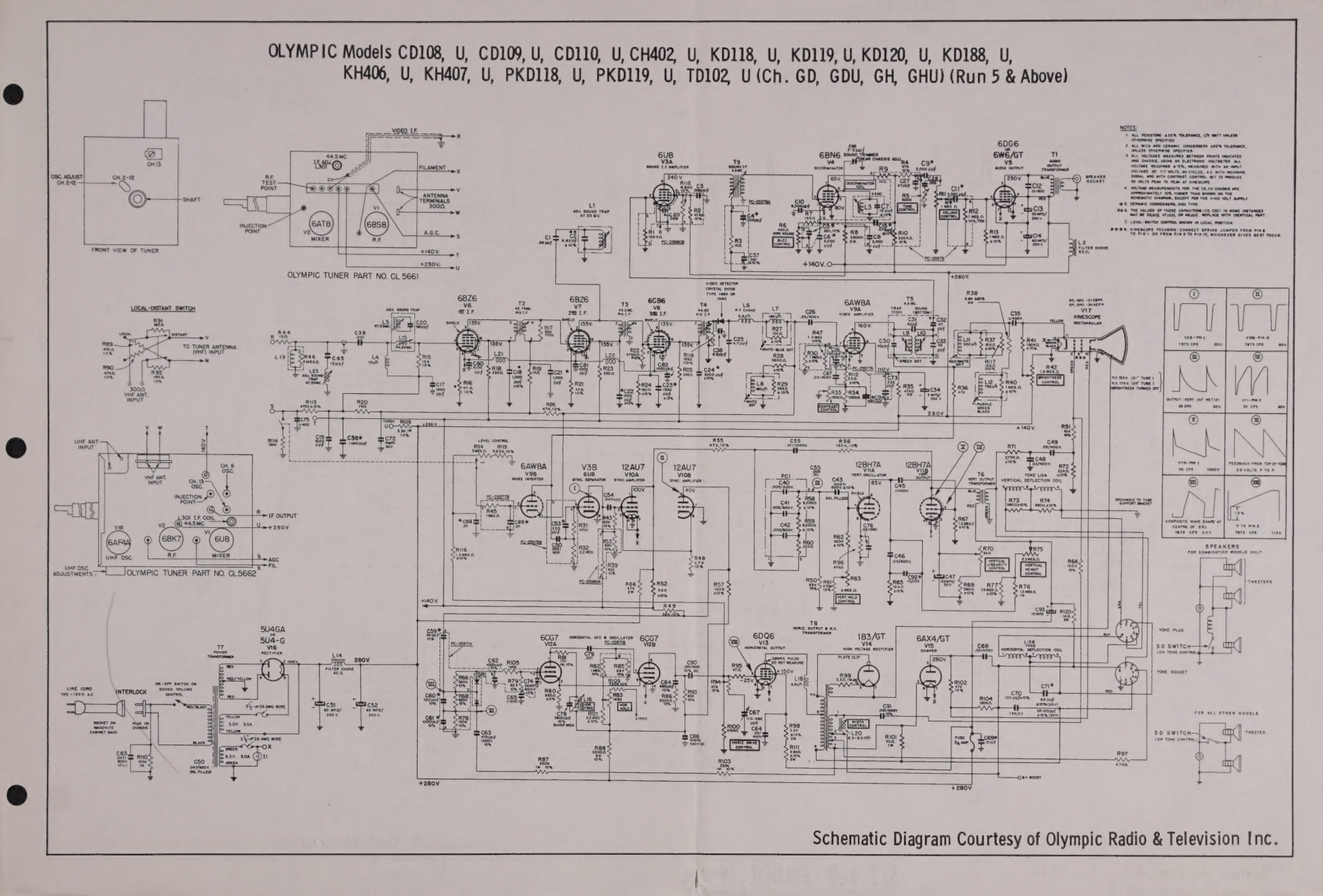
(When Ordering Cabinets & Cabinet Parts, Specify Model, Chassis & Color)

NAME	PART NO.	DESCRIPTION
Knob	270400	Loudness
Knob	270401	Tone
Case	230530	Brown & Beige

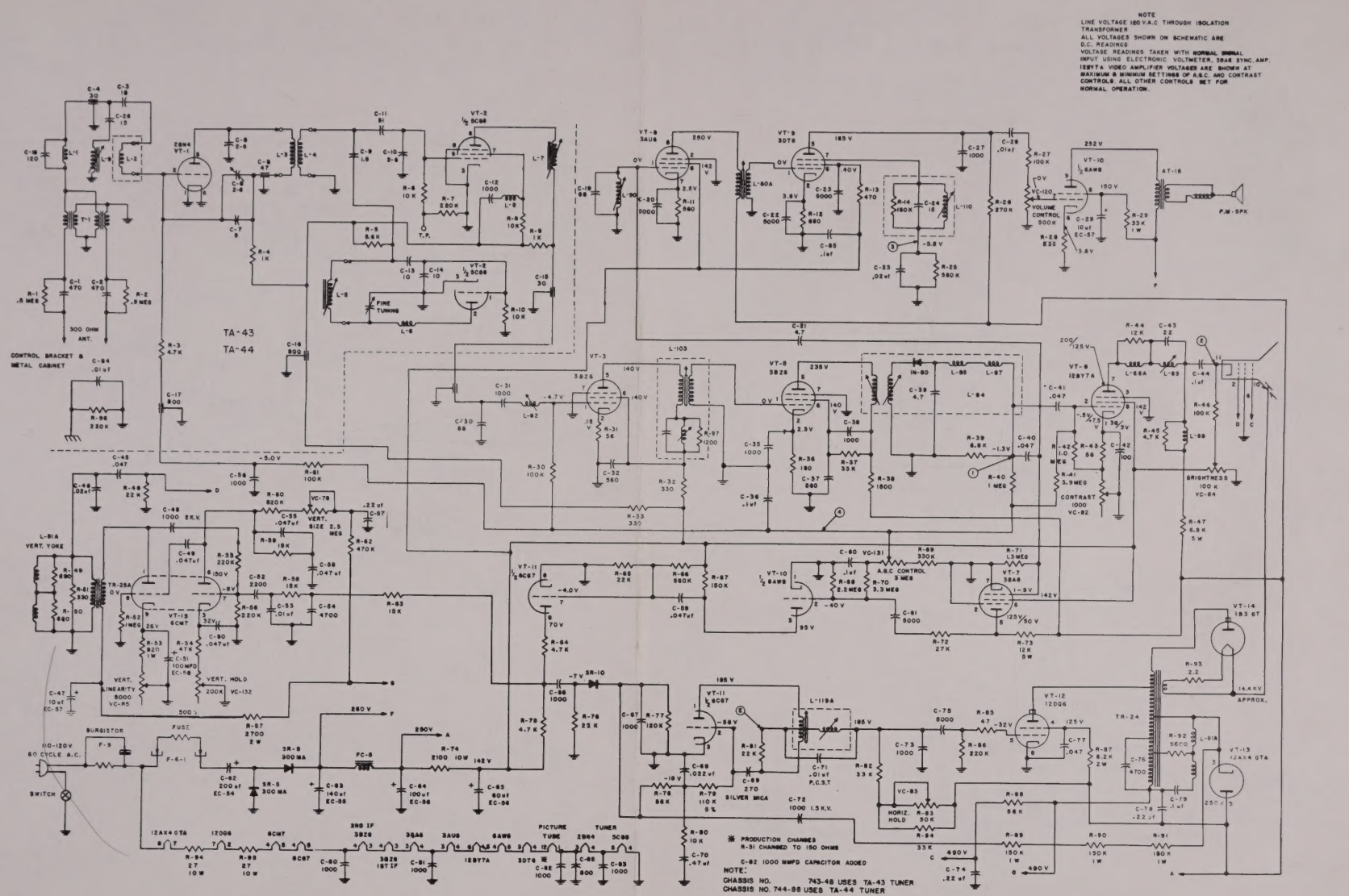
WIRING DATA

General-use Unshielded Hook-up Wire	Use BELDEN No. 8530 (Solid) Available in Ten Colors 8524 (Stranded) Available in Ten Colors
Power Cord	Use BELDEN No. 1765-B (6 Ft. Length) 1725-K (7½ Ft. Length)
Low-Loss Shielded Lead (Interconnecting)	Use BELDEN No. 8401
Phono Pick-up Arm Cable	Use BELDEN No. 8430 (Two Conductor - Twisted)

OLYMPIC Models CD108, U, CD109, U, CD110, U, CH402, U, KD118, U, KD119, U, KD120, U, KD188, U, KH406, U, KH407, U, PKD118, U, PKD119, U, TD102, U (Ch. GD, GDU, GH, GHU) (Run 5 & Above)


OLYMPIC TUNER PART NO. CL 5661
OLYMPIC TUNER PART NO. CL5662
SPEAKERS
FOR COMBINATION MODELS ONLY
TWEETERS
FOR ALL OTHER MODELS
TWEETER
3D SWITCH
10K TONE CONTROL
YOKE PLUG
YOKE SOCKET
INTERLOCK
LOCAL-DISTANT SWITCH
TO TUNER ANTENNA (VHF) INPUT
300Ω VHF ANT. INPUT
UHF ANT INPUT
VHF ANT. INPUT
UHF OSC. ADJUSTMENTS
FRONT VIEW OF TUNER
KINESCOPE
RECTANGULAR
6U8 V3A SOUND I.F. AMPLIFIER
6BN6 V4 DISCRIMINATOR
6DG6 OR 6W6/GT V5 AUDIO OUTPUT
T1 AUDIO OUTPUT TRANSFORMER
6BZ6 V6 1ST I.F.
6BZ6 V7 2ND I.F.
6CB6 V8 3RD I.F.
6AW8A V9A VIDEO AMPLIFIER
6AW8A V9B NOISE INVERTER
6AW8A V10B SYNC. SEPARATOR
12AU7 V10A SYNC. AMPLIFIER
12AU7 V10B SYNC. AMPLIFIER
12BH7A V11A VERT. OSCILLATOR
12BH7A V11B VERT. OUTPUT
6CG7 V12A HORIZONTAL AFC & OSCILLATOR
6CG7 V12B
6DQ6 V13 HORIZONTAL OUTPUT
1B3/GT V14 HIGH VOLTAGE RECTIFIER
6AX4/GT V15 DAMPER
5U4GA 5U4-G V16 RECTIFIER
6AF4A V1B UHF OSC.
6BK7 V2 R.F.
6U8 V1 MIXER
6AT8 V2 MIXER
6BS8 R.F.
T2 42.75MC MIX I.F.
T3 45.5MC MIX I.F.
T4 44.25 MIX I.F.
T5 4.5MC SOUND (BOTTOM)
T6 VERT. OUTPUT TRANSFORMER
T7 POWER TRANSFORMER
T8 HORIZ. OUTPUT & H.V. TRANSFORMER
L1 ADJ. SOUND TRAP 47.25 MC
L2 FILTER CHOKE 82Ω
L14 FILTER CHOKE 62Ω
L30 I.F. COIL 44.5MC
L38 HORIZONTAL DEFLECTION COIL
VIDEO I.F.
44.5 MC I.F. ADJ. L301
R.F. TEST POINT
INJECTION POINT
ANTENNA TERMINALS 300Ω
FILAMENT
A.G.C.
+140V.
+250V.
+280V.
+B+ BOOST
VIDEO DETECTOR CRYSTAL DIODE TYPE 1N64 OR 1N60
SOUND TRAP
VOLUME CONTROL
TONE CONTROL
BRIGHTNESS CONTROL
CONTRAST CONTROL
VERTICAL LINEARITY CONTROL
VERTICAL HEIGHT CONTROL
VERT. HOLD CONTROL
HORIZ. DRIVE CONTROL
HORIZ. HOLD CONTROL
HORIZONTAL LINEARITY CONTROL
HORIZ. CENTERING
HORIZ. WIDTH
DAMPER
FOCUS
BRIGHTNESS TURNED OFF
GROUNDED TO TUBE SUPPORT BRACKET
INTERLOCK
ON-OFF SWITCH ON SOUND VOLUME CONTROL
SOCKET ON CHASSIS CABINET BACK
PLUG ON CHASSIS
LINE CORD 105-120 V A.C.
NOTES:
1. ALL RESISTORS ±20% TOLERANCE, 1/2 WATT UNLESS OTHERWISE SPECIFIED.
2. ALL MICA AND CERAMIC CONDENSERS ±20% TOLERANCE, UNLESS OTHERWISE SPECIFIED.
3. ALL VOLTAGES MEASURED BETWEEN POINTS INDICATED AND CHASSIS, USING AN ELECTRONIC VOLTMETER. ALL VOLTAGE READINGS ±10%, MEASURED WITH AN INPUT VOLTAGE OF 117 VOLTS, 60 CYCLES, A.C. WITH INCOMING SIGNAL AND WITH CONTRAST CONTROL SET TO PRODUCE 50 VOLTS PEAK TO PEAK AT KINESCOPE.
4. VOLTAGE MEASUREMENTS FOR THE CH, CH CHASSIS ARE APPROXIMATELY 10% HIGHER THAN SHOWN ON THE SCHEMATIC DIAGRAM, EXCEPT FOR THE +140 VOLT SUPPLY.
5. CERAMIC CONDENSERS, DISC TYPE.
6. THE VALUES OF THESE CAPACITORS (CE, CDO) IN SOME INSTANCES MAY BE 10,000, 47,000, OR 68,000 REPLACE WITH IDENTICAL PART.
7. LEVEL-SWITCH CONTROL SHOWN IN LOCAL POSITION.
KINESCOPE FOCUSING: CONNECT SPRING JUMPER FROM PIN 6 TO PIN 7 OR FROM PIN 6 TO PIN 10, WHICHEVER GIVES BEST FOCUS.

Schematic Diagram Courtesy of Olympic Radio & Television Inc.


NOTE
LINE VOLTAGE 120 V.A.C THROUGH ISOLATION TRANSFORMER
ALL VOLTAGES SHOWN ON SCHEMATIC ARE D.C. READINGS
VOLTAGE READINGS TAKEN WITH NORMAL SIGNAL INPUT USING ELECTRONIC VOLTMETER, 20MS SYNC. AMP.
12BY7A VIDEO AMPLIFIER VOLTAGES ARE SHOWN AT MAXIMUM & MINIMUM SETTINGS OF A.G.C. AND CONTRAST CONTROLS. ALL OTHER CONTROLS SET FOR NORMAL OPERATION.
TA-43
TA-44
CONTROL BRACKET & METAL CABINET
300 OHM ANT.
FINE TUNING
VOLUME CONTROL 500K
BRIGHTNESS 100 K VC-84
CONTRAST 1000 VC-82
VERT. SIZE 2.5 MEG
VERT. LINEARITY 5000 VC-85
VERT. HOLD 200K VC-132
A.G.C. CONTROL 3 MEG
HORIZ. HOLD 50 K
L-81A VERT. YOKE
P.M. SPK
SILVER MICA
P.C.B.T
BURGISTOR
FUSE
SWITCH
110-120V 60 CYCLE A.C.
PRODUCTION CHANGES
R-31 CHANGED TO 150 OHMS
C-62 1000 MMFD CAPACITOR ADDED
NOTE:
CHASSIS NO. 743-48 USES TA-43 TUNER
CHASSIS NO. 744-88 USES TA-44 TUNER

TRUETONE Models 2DC1900A, 2DC1901A, 2DC3900A, 2DC3901A

Schematic Diagram Courtesy of Western Auto Supply Co.

© Howard W. Sams & Co., Inc. 1958